

297.1

STEAMFITTERS'  
HANDBOOK  
OF  
DIRECT AND INDIRECT  
RADIATORS

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THE H. B. SMITH CO.

728 Arch Street, PHILADELPHIA

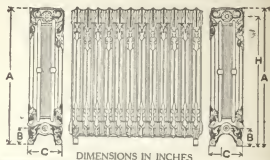
Works:  
WESTFIELD, MASS.

Salesroom:  
133 CENTRE STREET  
NEW YORK, N. Y.



DIRECT  
RADIATORS

## IMPERIAL UNION—STEAM and WATER



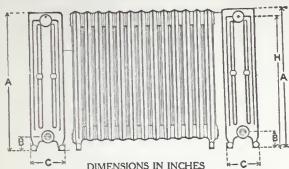
DIMENSIONS IN INCHES

<b>A</b>	Height of Radiator . . . . .	45	37	31	25	19
<b>H</b>	Height of Top Tapping . . .	43	35 $\frac{1}{8}$	29 $\frac{1}{8}$	23	17 $\frac{1}{8}$
<b>B</b>	Height of Regular Tapping . . . . .	4 $\frac{3}{8}$ inches				
<b>C</b>	Width of Section . . . . .	9 "				

## LIST OF SIZES

Number of Sections	Total Length Feet Inches	RADIATING SURFACE (Square Feet)				
		45 in. High	37 in. High	31 in. High	25 in. High	19 in. High
3	0 10 $\frac{1}{4}$	24	19 $\frac{1}{4}$	16 $\frac{1}{2}$	13 $\frac{1}{2}$	10 $\frac{1}{2}$
4	1 2	32	26	22	18	14
5	1 5 $\frac{1}{4}$	40	32 $\frac{1}{2}$	27 $\frac{1}{2}$	22 $\frac{1}{2}$	17 $\frac{1}{2}$
6	1 8 $\frac{1}{2}$	48	39	33	27	21
7	1 11 $\frac{1}{4}$	56	45 $\frac{1}{2}$	38 $\frac{1}{2}$	31 $\frac{1}{2}$	24 $\frac{1}{2}$
8	2 3	64	52	44	36	28
9	2 6 $\frac{1}{4}$	72	58 $\frac{1}{2}$	49 $\frac{1}{2}$	40 $\frac{1}{2}$	31 $\frac{1}{2}$
10	2 9 $\frac{1}{2}$	80	65	55	45	35
11	3 $\frac{1}{4}$	88	71 $\frac{1}{2}$	60 $\frac{1}{2}$	49 $\frac{1}{2}$	38 $\frac{1}{2}$
12	3 4	96	78	66	54	42
13	3 7 $\frac{1}{4}$	104	84 $\frac{1}{2}$	71 $\frac{1}{2}$	58 $\frac{1}{2}$	45 $\frac{1}{2}$
14	3 10 $\frac{1}{2}$	112	91	77	63	49
15	4 1 $\frac{1}{4}$	120	97 $\frac{1}{2}$	82 $\frac{1}{2}$	67 $\frac{1}{2}$	52 $\frac{1}{2}$
16	4 5	128	104	88	72	56
17	4 8 $\frac{1}{4}$	136	110 $\frac{1}{2}$	93 $\frac{1}{2}$	76 $\frac{1}{2}$	59 $\frac{1}{2}$
18	4 11 $\frac{1}{2}$	144	117	99	81	63
19	5 2 $\frac{1}{4}$	152	123 $\frac{1}{2}$	104 $\frac{1}{2}$	85 $\frac{1}{2}$	66 $\frac{1}{2}$
20	5 6	160	130	110	90	70
21	5 9 $\frac{1}{4}$	168	136 $\frac{1}{2}$	115 $\frac{1}{2}$	94 $\frac{1}{2}$	73 $\frac{1}{2}$
22	6 $\frac{1}{2}$	176	143	121	99	77
23	6 3 $\frac{1}{4}$	184	149 $\frac{1}{2}$	126 $\frac{1}{2}$	103 $\frac{1}{2}$	80 $\frac{1}{2}$
24	6 7	192	156	132	108	84
25	6 10 $\frac{1}{4}$	200	162 $\frac{1}{2}$	137 $\frac{1}{2}$	112 $\frac{1}{2}$	87 $\frac{1}{2}$
List Price in Cents per Square Foot		41	42	46	50	57

## PRINCESS UNION—STEAM and WATER



DIMENSIONS IN INCHES

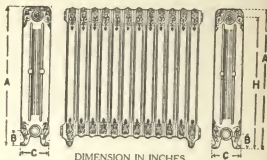
<b>A</b>	Height of Radiator .....	45	37	31	25	19
<b>H</b>	Height of Top Tapping .	43	35 $\frac{1}{2}$	29 $\frac{1}{2}$	23	17 $\frac{3}{4}$
<b>B</b>	Height of Regular Tapping.....	4 $\frac{5}{8}$ inches				
<b>C</b>	Width of Section.....	9 "				

## LIST OF SIZES

Number of Sections	Total Length		RADIATING SURFACE (Square Feet)				
			45 in. High	37 in. High	31 in. High	25 in. High	19 in. High
3	0	10 $\frac{1}{4}$	24	19 $\frac{1}{2}$	16 $\frac{1}{2}$	13 $\frac{1}{2}$	10 $\frac{1}{2}$
4	1	2	32	26	22	18	14
5	1	5 $\frac{1}{4}$	40	32 $\frac{1}{2}$	27 $\frac{1}{2}$	22 $\frac{1}{2}$	17 $\frac{1}{2}$
6	1	8 $\frac{1}{2}$	48	39	33	27	21
7	1	11 $\frac{1}{4}$	56	45 $\frac{1}{2}$	38 $\frac{1}{2}$	31 $\frac{1}{2}$	24 $\frac{1}{2}$
8	2	3	64	52	44	36	28
9	2	6 $\frac{1}{2}$	72	58 $\frac{1}{2}$	49 $\frac{1}{2}$	40 $\frac{1}{2}$	31 $\frac{1}{2}$
10	2	9 $\frac{1}{2}$	80	65	55	45	35
11	3	$\frac{3}{4}$	88	71 $\frac{1}{2}$	60 $\frac{1}{2}$	49 $\frac{1}{2}$	38 $\frac{1}{2}$
12	3	4	96	78	66	54	42
13	3	7 $\frac{1}{4}$	104	84 $\frac{1}{2}$	71 $\frac{1}{2}$	58 $\frac{1}{2}$	45 $\frac{1}{2}$
14	3	10 $\frac{1}{2}$	112	91	77	63	49
15	4	1 $\frac{1}{4}$	120	97 $\frac{1}{2}$	82 $\frac{1}{2}$	67 $\frac{1}{2}$	52 $\frac{1}{2}$
16	4	5	128	104	88	72	56
17	4	8 $\frac{1}{4}$	136	110 $\frac{1}{2}$	93 $\frac{1}{2}$	76 $\frac{1}{2}$	59 $\frac{1}{2}$
18	4	11 $\frac{1}{4}$	144	117	99	81	63
19	5	2 $\frac{1}{4}$	152	123 $\frac{1}{2}$	104 $\frac{1}{2}$	85 $\frac{1}{2}$	66 $\frac{1}{2}$
20	5	6	160	130	110	90	70
21	5	9 $\frac{1}{4}$	168	136 $\frac{1}{2}$	115 $\frac{1}{2}$	94 $\frac{1}{2}$	73 $\frac{1}{2}$
22	6	$\frac{1}{2}$	176	143	121	99	77
23	6	3 $\frac{1}{4}$	184	149 $\frac{1}{2}$	126 $\frac{1}{2}$	103 $\frac{1}{2}$	80 $\frac{1}{2}$
24	6	7	192	156	132	108	84
25	6	10 $\frac{1}{4}$	200	162 $\frac{1}{2}$	137 $\frac{1}{2}$	112 $\frac{1}{2}$	87 $\frac{1}{2}$
List Price in Cents per Square Foot			41	42	46	50	57

F2L 6589-06-105

## ROYAL UNION—STEAM or WATER



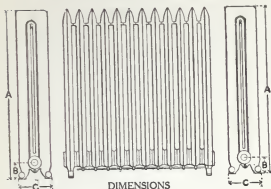
DIMENSION IN INCHES

<b>A</b>	Height of Radiator . . . .	44	38	30	24	18
<b>H</b>	Height of Top Tapping .	41 $\frac{1}{2}$	35 $\frac{1}{2}$	27 $\frac{1}{2}$	21 $\frac{1}{2}$	15 $\frac{1}{2}$
<b>B</b>	Height of Regular Tapping . . . . .	4 $\frac{5}{8}$ inches				
<b>C</b>	Width of Section . . . . .	8 $\frac{5}{8}$ "				

## LIST OF SIZES

Number of Sections	Total Length		RADIATING SURFACE (Square Feet)				
			44 in. High	38 in. High	30 in. High	24 in. High	18 in. High
3	0	10	18	15	12	9	6
4	1	1	24	20	16	12	8
5	1	4	30	25	20	15	10
6	1	7	36	30	24	18	12
7	1	10	42	35	28	21	14
8	2	1	48	40	32	24	16
9	2	4	54	45	36	27	18
10	2	7	60	50	40	30	20
11	2	10	66	55	44	33	22
12	3	1	72	60	48	36	24
13	3	4	78	65	52	39	26
14	3	7	84	70	56	42	28
15	3	10	90	75	60	45	30
16	4	1	96	80	64	48	32
17	4	4	102	85	68	51	34
18	4	7	108	90	72	54	36
19	4	10	114	95	76	57	38
20	5	1	120	100	80	60	40
21	5	4	126	105	84	63	42
22	5	7	132	110	88	66	44
23	5	10	138	115	92	69	46
24	6	1	144	120	96	72	48
25	6	4	150	125	100	75	50
List Price in Cents per Square Foot			41	42	46	50	58

## SCEPTER—STEAM ONLY



DIMENSIONS

- A** Height of Radiator ..... (See table below)  
**B** Height of Regular Tapping ..... 5 inches  
**C** Width of Section ..... 7 "

## LIST OF SIZES

Number of Sections	Total Length		RADIATING SURFACE (Square Feet)				
	Feet	Inches	44 in. High	38 in. High	30 in. High	24 in. High	18 in. High
3	0	8 3/4	14 3/4	12	9	7	5
4	0	10 3/4	19	16	12	9 1/2	6 3/4
5	1	1 3/4	23 3/4	20	15	11 1/2	8 3/4
6	1	3 3/4	28 1/2	24	18	14	10
7	1	5 3/4	33 1/4	28	21	16 3/4	11 3/4
8	1	8	38	32	24	18 3/4	13 3/4
9	1	10 3/4	42 3/4	36	27	21	15
10	2	3 3/4	47 3/4	40	30	23 1/2	16 3/4
11	2	3 3/4	52 1/4	44	33	25 1/2	18 3/4
12	2	5 1/2	57	48	36	28	20
13	2	7 3/4	61 3/4	52	39	30 1/2	21 3/4
14	2	10 1/4	66 1/2	56	42	32 1/2	23 3/4
15	3	3 3/4	71 1/4	60	45	35	25
16	3	3	76	64	48	37 1/2	26 3/4
17	3	5 3/4	80 3/4	68	51	39 3/4	28 1/2
18	3	7 3/4	85 1/2	72	54	42	30
19	3	10 1/4	90 1/4	76	57	44 1/2	31 3/4
20	4	3 3/4	95	80	60	46 3/4	33 3/4
21	4	2 3/4	99 1/4	84	63	49	35
22	4	5 3/4	104 1/2	88	66	51 1/2	36 3/4
23	4	7 3/4	109 1/4	92	69	53 3/4	38 3/4
24	4	10	114	96	72	56	40
25	5	3 3/4	118 3/4	100	75	58 1/2	41 3/4
List Price in Cents per Square Foot			41	42	46	50	58

# CORONET—STEAM and WATER

## SINGLE COLUMN



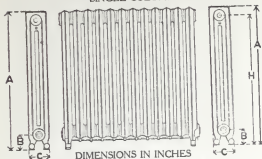
<b>A</b>	Height of Radiator	45	37	31	25	19
<b>H</b>	Height of Top Tapping	43 1/2	34 1/2	28 1/2	23 1/2	17 1/2
<b>B</b>	Height of Regular Tapping				4 1/2	inches
<b>C</b>	Width of Section				5 1/4	"

### LIST OF SIZES

Number of Sections	Total Length		RADIATING SURFACE. (Square Feet)				
	Feet	Inches	45 in. High	37 in. High	31 in. High	25 in. High	19 in. High
1	0	18	18 1/2	18 1/2	14	10	6
4	1	1	18 1/2	18 1/2	14	10	6
5	1	4	27 1/2	27 1/2	21	15	10
6	1	7	27 1/2	27 1/2	21	15	10
7	1	10	36 1/2	36 1/2	28	20	14
8	2	1	36 1/2	36 1/2	28	20	14
9	2	4	45 1/2	45 1/2	35	25 1/2	18
10	2	7	45 1/2	45 1/2	35	25 1/2	18
11	2	10	54 1/2	54 1/2	42	30	22
12	3	1	54 1/2	54 1/2	42	30	22
13	3	4	63 1/2	63 1/2	49	35 1/2	26
14	3	7	63 1/2	63 1/2	49	35 1/2	26
15	3	10	72 1/2	72 1/2	56	40 1/2	30
16	4	1	72 1/2	72 1/2	56	40 1/2	30
17	4	4	81 1/2	81 1/2	63	45 1/2	34
18	4	7	81 1/2	81 1/2	63	45 1/2	34
19	4	10	90 1/2	90 1/2	70	50 1/2	38
20	5	1	90 1/2	90 1/2	70	50 1/2	38
21	5	4	99 1/2	99 1/2	77	55 1/2	42
22	5	7	99 1/2	99 1/2	77	55 1/2	42
23	5	10	108 1/2	108 1/2	84	60 1/2	46
24	6	1	108 1/2	108 1/2	84	60 1/2	46
25	6	4	117 1/2	117 1/2	91	65 1/2	50
26	6	7	117 1/2	117 1/2	91	65 1/2	50
27	6	10	126 1/2	126 1/2	98	70 1/2	54
28	7	1	126 1/2	126 1/2	98	70 1/2	54
29	7	4	135 1/2	135 1/2	105	75 1/2	58
30	7	7	135 1/2	135 1/2	105	75 1/2	58
31	7	10	144 1/2	144 1/2	112	80 1/2	62
32	8	1	144 1/2	144 1/2	112	80 1/2	62
33	8	4	153 1/2	153 1/2	119	85 1/2	66
34	8	7	153 1/2	153 1/2	119	85 1/2	66
35	8	10	162 1/2	162 1/2	126	90 1/2	70
36	9	1	162 1/2	162 1/2	126	90 1/2	70
37	9	4	171 1/2	171 1/2	133	95 1/2	74
38	9	7	171 1/2	171 1/2	133	95 1/2	74
39	9	10	180 1/2	180 1/2	140	100 1/2	78
40	10	1	180 1/2	180 1/2	140	100 1/2	78
41	10	4	189 1/2	189 1/2	147	105 1/2	82
42	10	7	189 1/2	189 1/2	147	105 1/2	82
43	10	10	198 1/2	198 1/2	154	110 1/2	86
44	11	1	198 1/2	198 1/2	154	110 1/2	86
45	11	4	207 1/2	207 1/2	161	115 1/2	90
46	11	7	207 1/2	207 1/2	161	115 1/2	90
47	11	10	216 1/2	216 1/2	168	120 1/2	94
48	12	1	216 1/2	216 1/2	168	120 1/2	94
49	12	4	225 1/2	225 1/2	175	125 1/2	98
50	12	7	225 1/2	225 1/2	175	125 1/2	98
51	12	10	234 1/2	234 1/2	182	130 1/2	102
52	13	1	234 1/2	234 1/2	182	130 1/2	102
53	13	4	243 1/2	243 1/2	189	135 1/2	106
54	13	7	243 1/2	243 1/2	189	135 1/2	106
55	13	10	252 1/2	252 1/2	196	140 1/2	110
56	14	1	252 1/2	252 1/2	196	140 1/2	110
57	14	4	261 1/2	261 1/2	203	145 1/2	114
58	14	7	261 1/2	261 1/2	203	145 1/2	114
59	14	10	270 1/2	270 1/2	210	150 1/2	118
60	15	1	270 1/2	270 1/2	210	150 1/2	118
61	15	4	279 1/2	279 1/2	217	155 1/2	122
62	15	7	279 1/2	279 1/2	217	155 1/2	122
63	15	10	288 1/2	288 1/2	224	160 1/2	126
64	16	1	288 1/2	288 1/2	224	160 1/2	126
65	16	4	297 1/2	297 1/2	231	165 1/2	130
66	16	7	297 1/2	297 1/2	231	165 1/2	130
67	16	10	306 1/2	306 1/2	238	170 1/2	134
68	17	1	306 1/2	306 1/2	238	170 1/2	134
69	17	4	315 1/2	315 1/2	245	175 1/2	138
70	17	7	315 1/2	315 1/2	245	175 1/2	138
71	17	10	324 1/2	324 1/2	252	180 1/2	142
72	18	1	324 1/2	324 1/2	252	180 1/2	142
73	18	4	333 1/2	333 1/2	259	185 1/2	146
74	18	7	333 1/2	333 1/2	259	185 1/2	146
75	18	10	342 1/2	342 1/2	266	190 1/2	150
76	19	1	342 1/2	342 1/2	266	190 1/2	150
77	19	4	351 1/2	351 1/2	273	195 1/2	154
78	19	7	351 1/2	351 1/2	273	195 1/2	154
79	19	10	360 1/2	360 1/2	280	200 1/2	158
80	20	1	360 1/2	360 1/2	280	200 1/2	158
81	20	4	369 1/2	369 1/2	287	205 1/2	162
82	20	7	369 1/2	369 1/2	287	205 1/2	162
83	20	10	378 1/2	378 1/2	294	210 1/2	166
84	21	1	378 1/2	378 1/2	294	210 1/2	166
85	21	4	387 1/2	387 1/2	301	215 1/2	170
86	21	7	387 1/2	387 1/2	301	215 1/2	170
87	21	10	396 1/2	396 1/2	308	220 1/2	174
88	22	1	396 1/2	396 1/2	308	220 1/2	174
89	22	4	405 1/2	405 1/2	315	225 1/2	178
90	22	7	405 1/2	405 1/2	315	225 1/2	178
91	22	10	414 1/2	414 1/2	322	230 1/2	182
92	23	1	414 1/2	414 1/2	322	230 1/2	182
93	23	4	423 1/2	423 1/2	329	235 1/2	186
94	23	7	423 1/2	423 1/2	329	235 1/2	186
95	23	10	432 1/2	432 1/2	336	240 1/2	190
96	24	1	432 1/2	432 1/2	336	240 1/2	190
97	24	4	441 1/2	441 1/2	343	245 1/2	194
98	24	7	441 1/2	441 1/2	343	245 1/2	194
99	24	10	450 1/2	450 1/2	350	250 1/2	198
100	25	1	450 1/2	450 1/2	350	250 1/2	198
101	25	4	459 1/2	459 1/2	357	255 1/2	202
102	25	7	459 1/2	459 1/2	357	255 1/2	202
103	25	10	468 1/2	468 1/2	364	260 1/2	206
104	26	1	468 1/2	468 1/2	364	260 1/2	206
105	26	4	477 1/2	477 1/2	371	265 1/2	210
106	26	7	477 1/2	477 1/2	371	265 1/2	210
107	26	10	486 1/2	486 1/2	378	270 1/2	214
108	27	1	486 1/2	486 1/2	378	270 1/2	214
109	27	4	495 1/2	495 1/2	385	275 1/2	218
110	27	7	495 1/2	495 1/2	385	275 1/2	218
111	27	10	504 1/2	504 1/2	392	280 1/2	222
112	28	1	504 1/2	504 1/2	392	280 1/2	222
113	28	4	513 1/2	513 1/2	399	285 1/2	226
114	28	7	513 1/2	513 1/2	399	285 1/2	226
115	28	10	522 1/2	522 1/2	406	290 1/2	230
116	29	1	522 1/2	522 1/2	406	290 1/2	230
117	29	4	531 1/2	531 1/2	413	295 1/2	234
118	29	7	531 1/2	531 1/2	413	295 1/2	234
119	29	10	540 1/2	540 1/2	420	300 1/2	238
120	30	1	540 1/2	540 1/2	420	300 1/2	238
121	30	4	549 1/2	549 1/2	427	305 1/2	242
122	30	7	549 1/2	549 1/2	427	305 1/2	242
123	30	10	558 1/2	558 1/2	434	310 1/2	246
124	31	1	558 1/2	558 1/2	434	310 1/2	246
125	31	4	567 1/2	567 1/2	441	315 1/2	250
126	31	7	567 1/2	567 1/2	441	315 1/2	250
127	31	10	576 1/2	576 1/2	448	320 1/2	254
128	32	1	576 1/2	576 1/2	448	320 1/2	254
129	32	4	585 1/2	585 1/2	455	325 1/2	258
130	32	7	585 1/2	585 1/2	455	325 1/2	258
131	32	10	594 1/2	594 1/2	462	330 1/2	262
132	33	1	594 1/2	594 1/2	462	330 1/2	262
133	33	4	603 1/2	603 1/2	469	335 1/2	266
134	33	7	603 1/2	603 1/2	469	335 1/2	266
135	33	10	612 1/2	612 1/2	476	340 1/2	270
136	34	1	612 1/2	612 1/2	476	340 1/2	270
137	34	4	621 1/2	621 1/2	483	345 1/2	274
138	34	7	621 1/2	621 1/2	483	345 1/2	274
139	34	10	630 1/2	630 1/2	490	350 1/2	278
140	35	1	630 1/2	630 1/2	490	350 1/2	278
141	35	4	639 1/2	639 1/2	497	355 1/2	282
142	35	7	639 1/2	639 1/2	497	355 1/2	282
143	35	10	648 1/2	648 1/2	504	360 1/2	286
144	36	1	648 1/2	648 1/2	504	360 1/2	286
145	36	4	657 1/2	657 1/2	511	365 1/2	290
146	36	7	657 1/2	657 1/2	511	365 1/2	290
147	36	10	666 1/2	666 1/2	518	370 1/2	294
148	37	1	666 1/2	666 1/2	518	370 1/2	294
149	37	4	675 1/2	675 1/2	525	375 1/2	298
150	37	7	675 1/2	675 1/2	525	375 1/2	298
151	37	10	684 1/2	684 1/2	532	380 1/2	302
152	38	1	684 1/2	684 1/2	532	380 1/2	302
153	38	4	693 1/2	693 1/2	539	385 1/2	306
154	38	7	693 1/2	693 1/2	539	385 1/2	306
155	38	10	702 1/2	702 1/2	546	390 1/2	310
156	39	1	702 1/2	702 1/2	546	390 1/2	310
157	39	4	711 1/2	711 1/2	553	395 1/2	314
158	39	7	711 1/2	711 1/2	553	395 1/2	314
159	39	10	720 1/2	720 1/2	560	400 1/2	318
160	40	1	720 1/2	720 1/2	560	400 1/2	318
161	40	4	729 1/2	729 1/2	567	405 1/2	322
162	40	7	729 1/2	729 1/2	567	405 1/2	322
163	40	10	738 1/2	738 1/2	574		



# DIADEM—STEAM and WATER SINGLE COLUMN

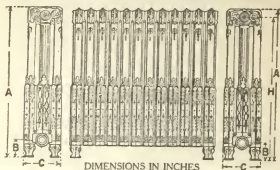


<b>A</b>	Height of Radiator .....	45	37	31	25	19
<b>H</b>	Height of Top Tapping..	43 $\frac{3}{8}$	34 $\frac{11}{16}$	28 $\frac{1}{8}$	23 $\frac{1}{8}$	17 $\frac{1}{8}$
<b>B</b>	Height of Regular Tapping.....	4 $\frac{5}{8}$ inches				
<b>C</b>	Width of Section .....	5 $\frac{1}{4}$ "				

## LIST OF SIZES

Number of Sections	Total Length Feet   Inches		RADIATING SURFACE (Square Feet)				
			45 in. High	37 in. High	31 in. High	25 in. High	19 in. High
3	0	10	13 $\frac{1}{2}$	10 $\frac{1}{2}$	9	7 $\frac{1}{2}$	6
4	1	1	18	14	12	10	8
5	1	4	22 $\frac{1}{2}$	17 $\frac{1}{2}$	15	12 $\frac{1}{2}$	10
6	1	7	27	21	18	15	12
7	1	10	31 $\frac{1}{2}$	24 $\frac{1}{2}$	21	17 $\frac{1}{2}$	14
8	2	1	36	28	24	20	16
9	2	4	40 $\frac{1}{2}$	31 $\frac{1}{2}$	27	22 $\frac{1}{2}$	18
10	2	7	45	35	30	25	20
11	2	10	49 $\frac{1}{2}$	38 $\frac{1}{2}$	33	27 $\frac{1}{2}$	22
12	3	1	54	42	36	30	24
13	3	4	58 $\frac{1}{2}$	45 $\frac{1}{2}$	39	32 $\frac{1}{2}$	26
14	3	7	63	49	42	35	28
15	3	10	67 $\frac{1}{2}$	52 $\frac{1}{2}$	45	37 $\frac{1}{2}$	30
16	4	1	72	56	48	40	32
17	4	4	76 $\frac{1}{2}$	59 $\frac{1}{2}$	51	42 $\frac{1}{2}$	34
18	4	7	81	63	54	45	36
19	4	10	85 $\frac{1}{2}$	66 $\frac{1}{2}$	57	47 $\frac{1}{2}$	38
20	5	1	90	70	60	50	40
21	5	4	94 $\frac{1}{2}$	73 $\frac{1}{2}$	63	52 $\frac{1}{2}$	42
22	5	7	99	77	66	55	44
23	5	10	103 $\frac{1}{2}$	80 $\frac{1}{2}$	69	57 $\frac{1}{2}$	46
24	6	1	108	84	72	60	48
25	6	4	112 $\frac{1}{2}$	87 $\frac{1}{2}$	75	62 $\frac{1}{2}$	50
List Price in Cents per Square Feet			41	42	46	50	57

## SOVEREIGN UNION—STEAM or WATER



<b>A</b>	Height of Radiator.....	37	31	25
<b>H</b>	Height of Top Tapping. . .	35½	29½	23½
<b>B</b>	Height of Regular Tapping.....	5 inches		
<b>C</b>	Width of Section....	8½ "		

## LIST OF SIZES

Number of Sections	Total Length		RADIATING SURFACE (Square Feet)		
	Feet	Inches	37 in. High	31 in. High	25 in. High
3	0	9½	18	15	12
4	0	11¾	24	20	16
5	1	2½	30	25	20
6	1	5½	36	30	24
7	1	7½	42	35	28
8	1	10½	48	40	32
9	2	1½	54	45	36
10	2	3¾	60	50	40
11	2	6½	66	55	44
12	2	9½	72	60	48
13	2	11½	78	65	52
14	3	2¾	84	70	56
15	3	5½	90	75	60
16	3	8	96	80	64
17	3	10½	102	85	68
18	4	1¾	108	90	72
19	4	4½	114	95	76
20	4	6½	120	100	80
21	4	9½	126	105	84
22	5	1¼	132	110	88
23	5	2½	138	115	92
24	5	5½	144	120	96
25	5	8½	150	125	100
List Price in Cents per Square Foot			42	46	50

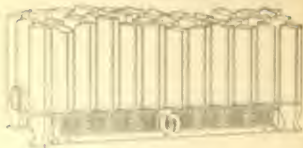
UNION  
DAMPER BASE

FOR

SOVEREIGN RADIATOR ONLY

THE H. B. SMITH CO.

UNION DAMPER BASE  
FOR SOVEREIGN RADIATOR ONLY



12 Section Radiator  
11 Section Full Length Base

SPECIAL NOTICE

Radiator's 21 sections and longer have center leg.  
When center leg is used, Base cannot extend the full length of Radiator.

When Radiator longer than 20 sections is required to pass from under corner of Radiator specify on order that Radiator is to have two center legs giving the distance (10 sections) between center legs.

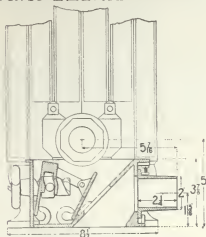
Specify on order (in sections) length of Base.  
Each Radiator Section is 24 inches in length.



15 Section Radiator  
8 Section Base

# THE H. B. SMITH CO.

## UNION DAMPER BASE FOR SOVEREIGN RADIATOR ONLY



Showing Construction and Method of Operation



Rear View

### DIMENSIONS

Length of Base in number of Sovereign Sections	A Length of Base	B Length of Thimble	Price
4	10 1/4"	6 1/2"	\$2.50
5	13"	6 3/4"	3.00
6	15 3/4"	9 1/4"	3.50
7	18 3/4"	11 1/4"	4.00
8	21"	14 1/8"	4.50
9	23 3/4"	17"	5.00
10	26 3/4"	19 1/4"	5.50
11	29"	19"	6.00
12	31 3/4"	19"	6.50
13	34 3/4"	19"	7.00
14	37 3/4"	19"	7.50
15	39 3/4"	19"	8.00
16	42 3/4"	19"	8.50
17	45 3/4"	19"	9.00
18	47 3/4"	19"	9.50

# THE H. B. SMITH CO.

## SOVEREIGN STEAM or WATER

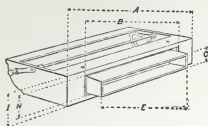


A	Height of Cylinder	31	31	35
H	Height of Piston	24	24	24
B	Height of Piston			5 inches
C	Width of Piston			8 1/2

### LIST OF SIZES

Cylinders	Pistons	SURFACE (Square Feet)	
		7 1/2 in High	7 1/2 in High
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9
10	10	10	10
11	11	11	11
12	12	12	12
13	13	13	13
14	14	14	14
15	15	15	15
16	16	16	16
17	17	17	17
18	18	18	18
19	19	19	19
20	20	20	20
21	21	21	21
22	22	22	22
23	23	23	23
24	24	24	24
25	25	25	25
26	26	26	26
27	27	27	27
28	28	28	28
29	29	29	29
30	30	30	30

## DETACHED BASE AND DAMPER



Rear of Base

Air Inlet through back

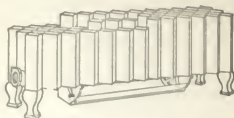
Damper open to admit outside air

## LIST OF SIZES

- A** Length of Base.  
**B** Length of back opening to receive Thimble.  
**C** Height of Thimble (2 inches).  
**D** Length of Base in number of Sovereign Union Sections.  
**E** Length of Thimble.  
**F** Height of back opening to receive Thimble ( $2\frac{1}{2}$  inches).  
**G** Height of Base ( $3\frac{3}{8}$  inches).

D	A	B	E	Price
4 Sections	$9\frac{1}{2}"$	$7\frac{1}{2}"$	$6\frac{3}{8}"$	\$2.50
5 "	$13\frac{1}{2}"$	$8\frac{1}{8}"$	$6\frac{1}{2}"$	3.00
6 "	16"	$10\frac{1}{2}"$	$9\frac{1}{2}"$	3.50
7 "	$18\frac{1}{2}"$	$13\frac{3}{8}"$	$11\frac{1}{2}"$	4.00
8 "	$21\frac{1}{8}"$	$15\frac{1}{4}"$	$14\frac{1}{8}"$	4.50
9 "	$24\frac{1}{8}"$	$18\frac{1}{2}"$	17"	5.00
10 "	$26\frac{1}{2}"$	$21\frac{1}{8}"$	$19\frac{1}{2}"$	5.50
11 "	$29\frac{1}{2}"$	$23\frac{3}{8}"$	$22\frac{1}{8}"$	6.00
12 "	$31\frac{3}{4}"$	$26\frac{1}{8}"$	$25\frac{1}{4}"$	6.50
13 "	$34\frac{3}{4}"$	$28\frac{1}{8}"$	$27\frac{3}{8}"$	7.00
14 "	$37\frac{1}{4}"$	$31\frac{1}{2}"$	$30\frac{1}{8}"$	7.50
15 "	40"	$34\frac{1}{2}"$	$32\frac{1}{2}"$	8.00
16 "	$43\frac{1}{8}"$	$37\frac{1}{4}"$	$35\frac{1}{8}"$	8.50
17 "	$45\frac{1}{2}"$	$39\frac{1}{2}"$	$37\frac{3}{8}"$	9.00
18 "	$48\frac{3}{4}"$	$39\frac{1}{4}"$	$37\frac{1}{2}"$	9.50

## DETACHED BASE AND DAMPER



11 SECTION RADIATOR—7 SECTION BASE (16 $\frac{1}{4}$ " long)  
Handle for operating at end of Base

## SPECIAL NOTICE

DETACHED BASE AND DAMPER IS USED WITH  
SOVEREIGN UNION RADIATOR ONLY

Radiators 21 Sections and longer have center leg

When center leg is used, Base with Damper cannot extend the full length of Radiator

When Radiator shorter than 21 Sections, is required to have Base with Damper, let center of Radiator specify on order that Radiator is to be centered on center leg, giving the distance (in Sections) from center leg

When Base extends full distance between legs the Damper is centered by handle (long) placed at center of Damper

When Base does not extend full length between legs the Damper is operated by handle at end of Base

When otherwise specified, Base will be shipped with air inlet on end and Handle at end

Length of center (in Sections) "D" length of Base (See page 9)

Base Radiator Section 11 21 $\frac{1}{4}$ " length



## BASE FULL LENGTH OF RADIATOR

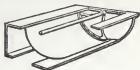
12 section Radiator 11 section Base (29 $\frac{1}{4}$ " long) Handle for operating at center of Damper



## DETACHED BASE AND DAMPER



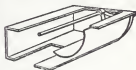
Damper closed to admit  
air from room



Damper closed to admit  
outside air



Damper open to admit  
air from room



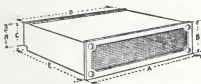
Damper open to admit  
outside air

AIR INLET THROUGH  
BACK

AIR INLET THROUGH  
FLOOR

Unless otherwise specified, Base will be shipped with  
air inlet through back.

## WALL BOX



DIMENSIONS IN INCHES

SIZES	A	B	C	D	E	H	Price
2"x12"	13	3	2 $\frac{7}{16}$	12 $\frac{1}{2}$	9	1 $\frac{7}{8}$	\$2.00
2"x16"	17	3	2 $\frac{7}{16}$	16 $\frac{1}{2}$	9	1 $\frac{7}{8}$	\$2.50
2"x20"	20 $\frac{1}{8}$	3	2 $\frac{7}{16}$	20 $\frac{3}{8}$	9	1 $\frac{7}{8}$	\$3.00

## FIVE-COLUMN PRINCESS

(Window Radiator)



DIMENSIONS IN INCHES

<b>A</b>	Height of Radiator . . . . .	16	14	12
<b>H</b>	Height of Top Tapping . . . . .	14	12	10
<b>B</b>	Height of Regular Tapping . . . . .	3 inches		
<b>C</b>	Width of Section . . . . .	12 "		

## LIST OF SIZES

Number of Sections	Total Length		RADIATING SURFACE (Square Feet)			
	Feet	Inches	12 in. High	14 in. High	16 in. High	18 in. High
3	0	10 1/4	10	12	14	16
4	1	2	13 1/4	16	18 1/2	21
5	1	5 1/4	16	20	23 1/2	26
6	1	8 1/2	20	24	28	32
7	1	11 3/4	23 1/4	28	32 3/4	37
8	2	3	26	32	37	42
9	2	6 1/2	30	36	42	48
10	2	9 1/2	33 1/4	40	46 1/4	52
11	3	0 1/2	36	44	51 1/4	58
12	3	4 1/2	40	48	56	64
13	3	7 1/2	43 1/4	52	60 1/4	68
14	3	10 1/2	46	56	65 1/4	74
15	4	1 1/4	50	60	70	78
16	4	5	53 1/4	64	74 1/4	82
17	4	8 1/4	56	68	79 1/4	86
18	4	11 1/4	60	72	84	90
19	5	2 1/4	63 1/4	76	88 1/4	94
20	5	6	66	80	93 1/4	98
21	5	9 1/4	70	84	98 1/4	104
22	6	0 1/4	73 1/4	88	102 1/4	108
23	6	3 1/4	76	92	107 1/4	112
24	6	7	80	96	112 1/4	116 1/4
25	6	10 1/4	83 1/4	100	116 1/4	120
List Price in Cents per Square Foot			60	64	68	72

Two Column  
IMPERIAL AND  
PRINCESS

Five Column  
PRINCESS

RADIATORS

NOTICE

These Radiators will be ready for shipment  
about July 1st, 1907

# THE H. B. SMITH CO.

## TWO COLUMN IMPERIAL STEAM or WATER



DIMENSIONS IN INCHES

A	Height of Radiator	45	37	31	25	19
H	Height of Top Fitting	43	35	29	23	17
B	Height of Regular Fitting					4 1/2 inches
C	Width of Radiator					

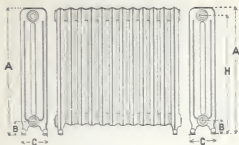
### LIST OF SIZES

RADIATING SURFACE (Square Feet)

Height	Width	Area	Height	Width	Area	Height	Width	Area	Height	Width	Area	Height	Width	Area	Height	Width	Area
19	19	361	25	25	625	31	31	961	37	37	1369	43	43	1849	49	49	2401
25	25	625	31	31	961	37	37	1369	43	43	1849	49	49	2401	55	55	3025
31	31	961	37	37	1369	43	43	1849	49	49	2401	55	55	3025	61	61	3721
37	37	1369	43	43	1849	49	49	2401	55	55	3025	61	61	3721	67	67	4489
43	43	1849	49	49	2401	55	55	3025	61	61	3721	67	67	4489	73	73	5329
49	49	2401	55	55	3025	61	61	3721	67	67	4489	73	73	5329	79	79	6241
55	55	3025	61	61	3721	67	67	4489	73	73	5329	79	79	6241	85	85	7225
61	61	3721	67	67	4489	73	73	5329	79	79	6241	85	85	7225	91	91	8281
67	67	4489	73	73	5329	79	79	6241	85	85	7225	91	91	8281	97	97	9409
73	73	5329	79	79	6241	85	85	7225	91	91	8281	97	97	9409	103	103	10609
79	79	6241	85	85	7225	91	91	8281	97	97	9409	103	103	10609	109	109	11881
85	85	7225	91	91	8281	97	97	9409	103	103	10609	109	109	11881	115	115	13225
91	91	8281	97	97	9409	103	103	10609	109	109	11881	115	115	13225	121	121	14641
97	97	9409	103	103	10609	109	109	11881	115	115	13225	121	121	14641	127	127	16129
103	103	10609	109	109	11881	115	115	13225	121	121	14641	127	127	16129	133	133	17721
109	109	11881	115	115	13225	121	121	14641	127	127	16129	133	133	17721	139	139	19401
115	115	13225	121	121	14641	127	127	16129	133	133	17721	139	139	19401	145	145	21165
121	121	14641	127	127	16129	133	133	17721	139	139	19401	145	145	21165	151	151	22921
127	127	16129	133	133	17721	139	139	19401	145	145	21165	151	151	22921	157	157	24769
133	133	17721	139	139	19401	145	145	21165	151	151	22921	157	157	24769	163	163	26601
139	139	19401	145	145	21165	151	151	22921	157	157	24769	163	163	26601	169	169	28521
145	145	21165	151	151	22921	157	157	24769	163	163	26601	169	169	28521	175	175	30525
151	151	22921	157	157	24769	163	163	26601	169	169	28521	175	175	30525	181	181	32601
157	157	24769	163	163	26601	169	169	28521	175	175	30525	181	181	32601	187	187	34761
163	163	26601	169	169	28521	175	175	30525	181	181	32601	187	187	34761	193	193	36961
169	169	28521	175	175	30525	181	181	32601	187	187	34761	193	193	36961	199	199	39201
175	175	30525	181	181	32601	187	187	34761	193	193	36961	199	199	39201	205	205	41525
181	181	32601	187	187	34761	193	193	36961	199	199	39201	205	205	41525	211	211	43921
187	187	34761	193	193	36961	199	199	39201	205	205	41525	211	211	43921	217	217	46401
193	193	36961	199	199	39201	205	205	41525	211	211	43921	217	217	46401	223	223	48961
199	199	39201	205	205	41525	211	211	43921	217	217	46401	223	223	48961	229	229	51601
205	205	41525	211	211	43921	217	217	46401	223	223	48961	229	229	51601	235	235	54325
211	211	43921	217	217	46401	223	223	48961	229	229	51601	235	235	54325	241	241	57121
217	217	46401	223	223	48961	229	229	51601	235	235	54325	241	241	57121	247	247	60001
223	223	48961	229	229	51601	235	235	54325	241	241	57121	247	247	60001	253	253	62961
229	229	51601	235	235	54325	241	241	57121	247	247	60001	253	253	62961	259	259	66001
235	235	54325	241	241	57121	247	247	60001	253	253	62961	259	259	66001	265	265	69125
241	241	57121	247	247	60001	253	253	62961	259	259	66001	265	265	69125	271	271	72321
247	247	60001	253	253	62961	259	259	66001	265	265	69125	271	271	72321	277	277	75601
253	253	62961	259	259	66001	265	265	69125	271	271	72321	277	277	75601	283	283	78961
259	259	66001	265	265	69125	271	271	72321	277	277	75601	283	283	78961	289	289	82401
265	265	69125	271	271	72321	277	277	75601	283	283	78961	289	289	82401	295	295	85925
271	271	72321	277	277	75601	283	283	78961	289	289	82401	295	295	85925	301	301	89521
277	277	75601	283	283	78961	289	289	82401	295	295	85925	301	301	89521	307	307	93201
283	283	78961	289	289	82401	295	295	85925	301	301	89521	307	307	93201	313	313	96961
289	289	82401	295	295	85925	301	301	89521	307	307	93201	313	313	96961	319	319	100801
295	295	85925	301	301	89521	307	307	93201	313	313	96961	319	319	100801	325	325	104725
301	301	89521	307	307	93201	313	313	96961	319	319	100801	325	325	104725	331	331	108721
307	307	93201	313	313	96961	319	319	100801	325	325	104725	331	331	108721	337	337	112801
313	313	96961	319	319	100801	325	325	104725	331	331	108721	337	337	112801	343	343	116961
319	319	100801	325	325	104725	331	331	108721	337	337	112801	343	343	116961	349	349	121125
325	325	104725	331	331	108721	337	337	112801	343	343	116961	349	349	121125	355	355	125401
331	331	108721	337	337	112801	343	343	116961	349	349	121125	355	355	125401	361	361	129761
337	337	112801	343	343	116961	349	349	121125	355	355	125401	361	361	129761	367	367	133601
343	343	116961	349	349	121125	355	355	125401	361	361	129761	367	367	133601	373	373	137601
349	349	121125	355	355	125401	361	361	129761	367	367	133601	373	373	137601	379	379	141601
355	355	125401	361	361	129761	367	367	133601	373	373	137601	379	379	141601	385	385	145601
361	361	129761	367	367	133601	373	373	137601	385	385	145601	391	391	149601	397	397	153601
367	367	133601	373	373	137601	385	385	145601	391	391	149601	397	397	153601	403	403	157601
373	373	137601	385	385	145601	391	391	149601	397	397	153601	403	403	157601	409	409	161601
379	379	141601	391	391	149601	397	397	153601	403	403	157601	409	409	161601	415	415	165601
385	385	145601	397	397	153601	403	403	157601	409	409	161601	415	415	165601	421	421	169601
391	391	149601	403	403	157601	409	409	161601	415	415	165601	421	421	169601	427	427	173601
397	397	153601	409	409	161601	415	415	165601	421	421	169601	427	427	173601	433	433	177601
403	403	157601	415	415	165601	421	421	169601	427	427	173601	433	433	177601	439	439	181601
409	409	161601	421	421	169601	427	427	173601	433	433	177601	439	439	181601	445	445	185601
415	415	165601	427	427	173601	433	433	177601	439	439	181601	445	445	185601	451	451	189601
421	421	169601	433	433	177601	439	439	181601	445	445	185601	451	451	189601	457	457	193601
427	427	173601	439	439	181601	445	445	185601	451	451	189601	457	457	193601	463	463	197601
433	433	177601	445	445	185601	451	451	189601	457	457	193601	463	463	197601	469	469	201601
439	439	181601	451	451	189601	457	457	193601	463	463	197601	469	469	201601	475	475	205601
445	445	185601	457	457	193601	463	463	197601	469	469	201601	475	475	205601	481	481	209601
451	451	189601	463	463	197601	469	469	201601	475	475	205601	481	481	209601	487	487	213601
457	457	193601	469	469	201601	475	475	205601	481	481	209601	487	487	213601	493	493	217601
463	463	197601	475	475	205601	481	481	209601	487	487	213601	493	493	217601	499	499	221601
469	469	201601	481	481	209601	487	487	213601	493	493	217601	499	499	221601	</		

# THE H. B. SMITH CO.

## TWO COLUMN PRINCESS STEAM or WATER



DIMENSIONS IN INCHES

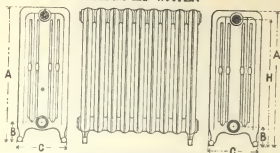
<b>A</b>	Height of Radiator . . . . .	45	37	31	25	19
<b>H</b>	Height of Top Tapping . . . . .	43 $\frac{1}{2}$	35 $\frac{1}{8}$	29 $\frac{1}{2}$	23 $\frac{1}{2}$	17 $\frac{1}{2}$
<b>B</b>	Height of Regular Tapping . . . . .	4 $\frac{3}{8}$ inches				
<b>C</b>	Width of Section . . . . .	7 "				

### LIST OF SIZES

Number of Sections	Total Length		RADIATING SURFACE (Square Feet)				
	Feet	Inches	45 in. High	37 in. High	31 in. High	25 in. High	19 in. High
3	0	10	15	12	10 $\frac{1}{2}$	9	6 $\frac{1}{2}$
4	1	1	20	16	14	12	9
5	1	4	25	20	17 $\frac{1}{2}$	15	11 $\frac{1}{2}$
6	1	7	30	24	21	18	13 $\frac{1}{2}$
7	1	10	35	28	24 $\frac{1}{2}$	21	15 $\frac{1}{2}$
8	2	1	40	32	28	24	18
9	2	4	45	36	31 $\frac{1}{2}$	27	20 $\frac{1}{2}$
10	2	7	50	40	35	30	22 $\frac{1}{2}$
11	2	10	55	44	38 $\frac{1}{2}$	33	24 $\frac{1}{2}$
12	3	1	60	48	42	36	27
13	3	4	65	52	45 $\frac{1}{2}$	39	29 $\frac{1}{2}$
14	3	7	70	56	49	42	31 $\frac{1}{2}$
15	3	10	75	60	52 $\frac{1}{2}$	45	33 $\frac{1}{2}$
16	4	1	80	64	56	48	36
17	4	4	85	68	59 $\frac{1}{2}$	51	38 $\frac{1}{2}$
18	4	7	90	72	63	54	40 $\frac{1}{2}$
19	4	10	95	76	66 $\frac{1}{2}$	57	42 $\frac{1}{2}$
20	5	1	100	80	70	60	45
21	5	4	105	84	73 $\frac{1}{2}$	63	47 $\frac{1}{2}$
22	5	7	110	88	77	66	49 $\frac{1}{2}$
23	5	10	115	92	80 $\frac{1}{2}$	69	51 $\frac{1}{2}$
24	6	1	120	96	84	72	54
25	6	4	125	100	87 $\frac{1}{2}$	75	56 $\frac{1}{2}$
List Price in Cents per Square Foot			41	42	46	50	57

# THE H. B. SMITH CO.

## FIVE COLUMN PRINCESS STEAM and WATER



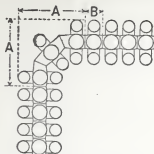
DIMENSIONS IN INCHES

A	Height of Radiator . . . . .	37	25
H	Height of Top Tapping. . . . .	35	23
B	Height of Regular Tapping. . . . .	4 1/8 inches	
C	Width of Section . . . . .	12 "	

### LIST OF SIZES

Number of Sections	Total Length		RADIATING SURFACE (Square Feet)	
	Feet	Inches	37 in. High	25 in. High
3	0	10 3/4	30	21
4	1	2	40	28
5	1	5 1/4	50	35
6	1	8 1/4	60	42
7	1	11 3/4	70	49
8	2	3	80	56
9	2	6 1/4	90	63
10	2	9 3/4	100	70
11	3	1 3/4	110	77
12	3	4	120	84
13	3	7 1/4	130	91
14	3	10 3/4	140	98
15	4	1 3/4	150	105
16	4	5	160	112
17	4	8 1/4	170	119
18	4	11 3/4	180	126
19	5	2 3/4	190	133
20	5	6	200	140
21	5	9 3/4	210	147
22	6	1 3/4	220	154
23	6	5 1/4	230	161
24	6	8 1/4	240	168
25	6	11 3/4	250	175
List Price in Cents per Square Foot			42	50

## CORNER RADIATOR



If the total number of sections in CORNER RADIATOR is odd (9, 11, 13, 15, etc.), each arm of the Radiator can be made of the same length. If, however, the Radiator contains an even number of Sections (8, 10, 12, 14, etc.), one arm must be longer than the other, in which case it is necessary to send a sketch, showing which arm is to contain the extra section, also which end is to be used for supply and which end for return.

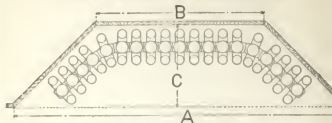
Corner Radiators are made only in the styles indicated below:

## DIMENSIONS

STYLE	A	B
Imperial Union.....	$12\frac{5}{8}$ "	$3\frac{1}{4}$ "
Princess Union.....		
Royal Union .....	12"	3"
Coronet .....	$9\frac{3}{4}$ "	3"
Diadem .....		

PRICE: Add \$3.00 NET per Radiator to regular price

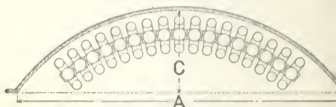
## BAY WINDOW RADIATOR



BAY WINDOW RADIATORS can be assembled in any desired size and on any desired angle. In ordering, specify the size of Radiator required (either in number of sections, or in square feet of surface), and the dimensions "A," "B," and "C."

PRICE: Add \$6.00 NET per Radiator to regular price  
(—\$3.00 NET for each angle)

## CURVED RADIATOR



CURVED RADIATORS can be assembled in any desired size or on any desired radius. In ordering, specify the size of Radiator required (either in number of sections or in square feet of surface), and the dimensions "A" and "C."

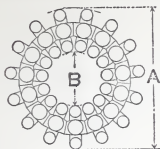
PRICE: Add \$0.60 NET per Section to regular price

Bay Window and Curved Radiators are made only in the following styles:

Single Column Radiators	CORONET AND DIADEM.
Three Column Radiators	IMPERIAL UNION,
	PRINCESS UNION AND ROYAL UNION.
Five Column Radiator	FIVE COLUMN PRINCESS.



## CIRCULAR RADIATOR



CIRCULAR RADIATORS can be assembled as one whole Radiator, or they can be assembled in halves for the purpose of encircling columns.

When Circular Radiators are in halves, each half becomes an independent Radiator. In ordering specify which method of assembling is desired.

Circular Radiators are made only in the styles and sizes indicated below:

## DIMENSIONS IN INCHES

Number of Sections	IMPERIAL UNION and PRINCESS UNION		CORONET and DIADEM	
	A Outside Diameter	B Inside Diameter	A Outside Diameter	B Inside Diameter
9	24 <sup>1</sup> / <sub>4</sub> In.	4 <sup>1</sup> / <sub>4</sub> In.	18 <sup>3</sup> / <sub>4</sub> In.	6 <sup>1</sup> / <sub>4</sub> In.
12	27 " "	7 " "	20 <sup>3</sup> / <sub>4</sub> " "	8 <sup>3</sup> / <sub>4</sub> " "
15	29 " "	9 " "	22 <sup>3</sup> / <sub>4</sub> " "	10 <sup>3</sup> / <sub>4</sub> " "
18	30 <sup>3</sup> / <sub>4</sub> " "	10 <sup>3</sup> / <sub>4</sub> " "	24 <sup>3</sup> / <sub>4</sub> " "	12 <sup>3</sup> / <sub>4</sub> " "
20	32 <sup>3</sup> / <sub>4</sub> " "	12 <sup>3</sup> / <sub>4</sub> " "	25 <sup>3</sup> / <sub>4</sub> " "	13 <sup>3</sup> / <sub>4</sub> " "
24	35 <sup>3</sup> / <sub>4</sub> " "	15 <sup>3</sup> / <sub>4</sub> " "	28 " "	15 <sup>3</sup> / <sub>4</sub> " "
30	40 <sup>3</sup> / <sub>4</sub> " "	20 <sup>3</sup> / <sub>4</sub> " "	32 <sup>3</sup> / <sub>4</sub> " "	20 <sup>3</sup> / <sub>4</sub> " "
36	44 <sup>3</sup> / <sub>4</sub> " "	24 <sup>3</sup> / <sub>4</sub> " "	35 <sup>3</sup> / <sub>4</sub> " "	22 <sup>3</sup> / <sub>4</sub> " "
40	47 <sup>3</sup> / <sub>4</sub> " "	27 <sup>3</sup> / <sub>4</sub> " "	39 <sup>1</sup> / <sub>4</sub> " "	26 <sup>3</sup> / <sub>4</sub> " "
45	51 <sup>1</sup> / <sub>4</sub> " "	31 <sup>3</sup> / <sub>4</sub> " "	43 <sup>3</sup> / <sub>4</sub> " "	30 <sup>3</sup> / <sub>4</sub> " "

PRICE: Add \$0.60 NET per Section to regular price

## RADIATOR CONCEALED BRACKETS

For  
Imperial Union  
Princess Union  
Royal Union  
Coronet and  
Diadem Radiators



Top Bracket

Price for Imperial, Princess and  
Royal Union, \$0.25 NET

Price for Coronet and Diadem  
\$0.12½ NET



Bottom Bracket

Price for Imperial, Princess and  
Royal Union, \$0.25 NET

Price for Coronet and Diadem  
\$0.12½ NET

For  
Scepter  
Radiators  
only



Top Bracket

Price \$0.12½ NET



Bottom Bracket

Price \$0.12½ NET

## DIMENSIONS IN INCHES

STYLE OF BRACKET	A	B	C	D	E	H	N	K
Imperial Union, Princess Union and Royal Union	5½	6½	½	4	4	5½	½	5½
Coronet and Diadem....	3½	5½	¾	3	3	4	¾	3½

# RADIATOR CONCEALED BRACKETS IN POSITION



For Imperial Union, Princess  
Union and Royal Union  
Radiators

A=5½ inches

B=10 inches

For Coronet and Diadem  
Radiators

A=3½ inches

B=6½ inches

For Scepter  
Radiator

A=4½ inches

B=7½ inches

## SOLID HIGH LEGS

In ordering Radiators with extra high legs, specify the amount in inches to be added to the regular leg.

PRICE for extra high Legs: Add \$0.40 NET per  
LEG Section to regular price

## RADIATOR BRACKETS



WALL BRACKET

## DIMENSIONS

For Imperial Union and  
Princess Union Radiators

A—16 inches

B—11 inches

C—4 inches

E—9 inches

Price \$2.00

For Coronet and  
Dixie Radiators

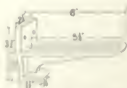
A—10 inches

B—6½ inches

C—3½ inches

E—5½ inches

Price \$1.00



BASEBOARD BRACKET

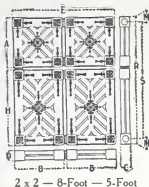
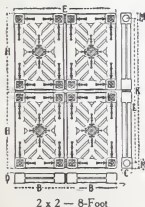
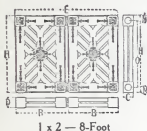
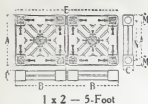
For Coronet and Dixie Radiators only

Price \$0.50

## X-RAY WALL RADIATOR

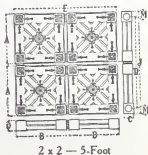
STEAM OR WATER

DIMENSIONS IN INCHES



A=14<sup>5</sup>/<sub>8</sub>"  
 B=14<sup>5</sup>/<sub>8</sub>"  
 C=3<sup>5</sup>/<sub>8</sub>"  
 D=3<sup>5</sup>/<sub>8</sub>"  
 E=29<sup>5</sup>/<sub>8</sub>"  
 H=21<sup>5</sup>/<sub>8</sub>"  
 J=29<sup>5</sup>/<sub>8</sub>"  
 K=44<sup>5</sup>/<sub>8</sub>"

L=41<sup>5</sup>/<sub>8</sub>"  
 M=1<sup>5</sup>/<sub>8</sub>"  
 N=11<sup>5</sup>/<sub>8</sub>"  
 O=18<sup>5</sup>/<sub>8</sub>"  
 R=36<sup>5</sup>/<sub>8</sub>"  
 S=33<sup>5</sup>/<sub>8</sub>"  
 T=26<sup>5</sup>/<sub>8</sub>"



## X-RAY WALL RADIATOR

## LIST OF SIZES

Number of Sections		5-FOOT X-RAY		8-FOOT X-RAY	
Height	Length	Sq. Feet of Surface	Length Feet Inches	Sq. Feet of Surface	Length Feet Inches
1 x 1		5	1— 2 $\frac{1}{8}$	8	1— 2 $\frac{1}{8}$
1 x 2		10	2— 5 $\frac{3}{8}$	16	2— 5 $\frac{3}{8}$
1 x 3		15	3— 8 $\frac{7}{8}$	24	3— 8 $\frac{7}{8}$
1 x 4		20	4— 11 $\frac{1}{2}$	32	4— 11 $\frac{1}{2}$
1 x 5		25	6— 2 $\frac{1}{2}$	40	6— 2 $\frac{1}{2}$
1 x 6		30	7— 5 $\frac{5}{8}$	48	7— 5 $\frac{5}{8}$
1 x 7		35	8— 8 $\frac{1}{4}$	56	8— 8 $\frac{1}{4}$
1 x 8		40	9— 11 $\frac{3}{4}$	64	9— 11 $\frac{3}{4}$
		Height 1 ft. 2 $\frac{5}{8}$ in.		Height 1 ft. 9 $\frac{1}{4}$ in.	
2 x 1		10	1— 2 $\frac{1}{8}$	16	1— 2 $\frac{1}{8}$
2 x 2		20	2— 5 $\frac{3}{8}$	32	2— 5 $\frac{3}{8}$
2 x 3		30	3— 8 $\frac{7}{8}$	48	3— 8 $\frac{7}{8}$
2 x 4		40	4— 11 $\frac{1}{2}$	64	4— 11 $\frac{1}{2}$
2 x 5		50	6— 2 $\frac{1}{2}$	80	6— 2 $\frac{1}{2}$
2 x 6		60	7— 5 $\frac{5}{8}$	96	7— 5 $\frac{5}{8}$
2 x 7		70	8— 8 $\frac{1}{4}$	112	8— 8 $\frac{1}{4}$
2 x 8		80	9— 11 $\frac{3}{4}$	128	9— 11 $\frac{3}{4}$
		Height 2 ft. 5 $\frac{3}{8}$ in.		Height 3 ft. 8 $\frac{1}{4}$ in.	
3 x 1		15	1— 2 $\frac{1}{8}$	24	1— 2 $\frac{1}{8}$
3 x 2		30	2— 5 $\frac{3}{8}$	48	2— 5 $\frac{3}{8}$
3 x 3		45	3— 8 $\frac{7}{8}$	72	3— 8 $\frac{7}{8}$
3 x 4		60	4— 11 $\frac{1}{2}$	96	4— 11 $\frac{1}{2}$
3 x 5		75	6— 2 $\frac{1}{2}$	120	6— 2 $\frac{1}{2}$
3 x 6		90	7— 5 $\frac{5}{8}$	144	7— 5 $\frac{5}{8}$
3 x 7		105	8— 8 $\frac{1}{4}$	168	8— 8 $\frac{1}{4}$
3 x 8		120	9— 11 $\frac{3}{4}$	192	9— 11 $\frac{3}{4}$
		Height 3 ft. 8 $\frac{7}{8}$ in.		Height 5 ft. 6 $\frac{1}{4}$ in.	

8-FOOT SECTION Radiators, longer than one section are NOT tapped to be used HORIZONTALLY.

PRICE: 5-foot and 8-foot X-Ray  
\$0.42 per square foot

# X-RAY WALL RADIATOR LEGS AND BRACKETS

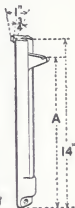


## REDUCIBLE BRACKET

Used with No. 1 and  
No. 2 X-Ray Bracket

A = 12 1/2 inches

but can be reduced to 5  
inches by cutting off the  
Reducible Bracket



No. 1

Price \$0.60  
Complete

No. 2

Price \$0.55  
Complete



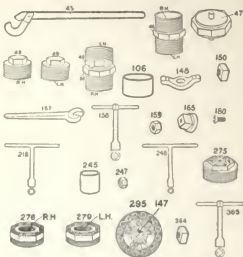
No. 3

Price \$0.20  
Complete

No. 4

Price \$0.20  
Complete

## DIRECT RADIATOR FITTINGS



## PRICE LIST

No.	Name	Size	NET Price	No.	Name	Size	NET Price
45	X Ray Wrench		\$3.00	180	Imperial Rosette Screw		\$ .00
46	R. and L. Nipple	1 1/2"	.10	218	Wrench for Nut		
47	Disk		.05	No. 159	1" Hex.	1.25	
48	R. H. Male Plug	1 1/2"	.05	245	Sovereign Top Nipple		.02
49	L. H. Male Plug	1 1/2"	.05	247	Sovereign Nut	1/2" Hex.	.00
50	R. H. Female Plug	1 1/2"	.05	248	Wrench for Nut		
106	Push Nipple		.02	No. 247	1/2" Hex.	.75	
145	Yoke		.02	275	Radiator Plug	2"	.05
150	Nut	1/2" Sq.	.00	276	Radiator Bushing R. H.	2"	.05
157	Wrench for Nut	No. 159 1" Hex.	.50	279	Radiator Bushing L. H.	2"	.05
158	Wrench for Nut	No. 159 1 1/2" Sq.	1.25	295	Royal Rosette		.02
159	Nut	1/2" Hex.	.00	364	Nut	1" Sq.	.00
180	Royal Steam Nut	1" Sq.	.02	365	Wrench for Nut	1" Sq.	1.25

\*Catalog number of part.



## DIRECT RADIATORS — REGULAR TAPPING

### STEAM

#### TWO-PIPE WORK

Radiators will be tapped for two-pipe work unless otherwise specified.

Radiators of 50 square feet and smaller .....	1" x $\frac{3}{4}$ "
Radiators larger than 50 square feet.....	1 $\frac{1}{4}$ " x 1"
Air Valve.....	$\frac{1}{8}$ "

#### ONE-PIPE WORK

Radiators of 30 square feet and smaller .....	1"
Radiators larger than 30 square feet and smaller than 60 square feet.....	1 $\frac{1}{4}$ "
Radiators larger than 60 square feet.....	1 $\frac{1}{2}$ "
Air Valve.. ..	$\frac{1}{8}$ "

### WATER

Radiators of 50 square feet and smaller.....	1" x 1"
Radiators larger than 50 square feet.....	1 $\frac{1}{4}$ " x 1 $\frac{1}{4}$ "
Air Valve.....	$\frac{1}{8}$ " at top

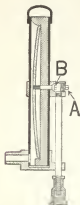
If radiators are required tapped top and bottom, same end, or top and bottom, opposite ends, so specify on order.

All tappings will be made RIGHT HAND unless otherwise specified.



BRECKENRIDGE'S  
AUTOMATIC  
AIR  
VALVES

## AUTOMATIC AIR VALVES



Sectional View

The cut opposite illustrates a sectional view of the No. 4 Valve, but also shows the Mechanical Construction of all Breckenridge Automatic Air Valves.

### TO SET VALVE

Remove the plug and unscrew the valve so that the steam will flow out freely. After the valve has become thoroughly heated close it lightly until the flow of steam stops (do not close the valve too hard on its seat), then screw in the plug and the valve will require no further attention.

These directions apply to all of the valves except No. 1, which is to be set with thumb screw instead of with key.

Keys are furnished with valves.

## FOR INDIRECT RADIATORS



No. 1 Valve

Cast Iron—Finished Black  
 $\frac{1}{2}$ " Connection

Price \$0.70



No. 2 Valve

Cast Iron—Finished Black  
 $\frac{1}{2}$ " Connection,  $\frac{1}{4}$ " Drip

Price \$0.80

## AUTOMATIC AIR VALVES

FOR DIRECT RADIATORS



No. 3 Valve

Brass—Nickel Plated  
 $\frac{1}{2}$ " Connection

Price \$1.00



No. 4 Valve

Brass—Nickel Plated  
 $\frac{1}{2}$ " Connection  $\frac{1}{2}$ " Drip

Price \$1.25



No. 5 Valve

Brass—Nickel Plated  
 $\frac{1}{2}$ " Connection

Price \$1.25



No. 6 Valve

Brass—Nickel Plated  
 $\frac{1}{2}$ " Connection  $\frac{1}{2}$ " Drip

Price \$1.25

## AUTOMATIC AIR VALVES

FOR DIRECT RADIATORS



No. 7 Valve

Brass—Nickel Plated  
 $\frac{1}{2}$ " Connection

Price \$1.25



No. 8 Valve

Brass—Nickel Plated  
 $\frac{1}{2}$ " Connection  $\frac{1}{4}$ " Drip

Price \$1.50



No. 9 Valve

Brass—Nickel Plated  
 $\frac{1}{2}$ " Connection

Price \$1.50



No. 6 Elbow

Brass—Nickel Plated  
Used with No. 6 Valve

Price \$0.25



No. 7 Elbow

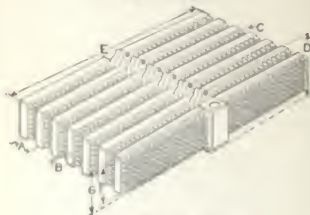
Brass—Nickel Plated  
Used with No. 7 Valve

Price \$0.25

INDIRECT  
RADIATORS

# REGULAR PATTERN GOLD PIN

STEAM OR WATER



10 Square Feet per Section

## DIMENSIONS OF SECTION

A	Distance from center of pin to center of next pin	3 1/2"
B	Distance from center of pin to center of next pin	3 1/2"
C	Length of Pin	4 1/2"
D	Height of Pin	10 1/2"
E	Length of Section	4 1/2"
F	Height of Section at each end	6"
G	Height of Section at center	7 1/2"

Shipping weight, per Section, 70 lbs.

## REGULAR TAPPING

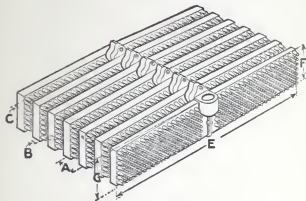
Supply	1 1/4"	Return	1 1/4"
Air Valve			1 1/4"

Price \$0.27 per Square Foot



# TEN-INCH FLANGE GOLD PIN

STEAM OR WATER



15 Square Feet per Section

## DIMENSIONS OF SECTION

<b>A</b>	Distance from center to center.....	$3\frac{1}{4}"$
<b>B</b>	Distance between ends of Pins .....	$\frac{1}{4}"$
<b>C</b>	Length of Pin.....	$\frac{3}{4}"$
<b>E</b>	Length of Section.....	$40\frac{1}{2}"$
<b>F</b>	Height of Section at end.....	$10\frac{1}{4}"$
<b>G</b>	Height of Section at center.....	$10\frac{3}{4}"$

Shipping weight, per Section, 108 lbs.

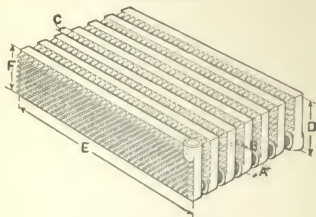
## REGULAR TAPPING

Supply.....	$1\frac{1}{2}"$	Return.....	$1\frac{1}{2}"$
Air Valve..... $\frac{3}{8}"$			

Price \$0.27 per Square Foot

# 12-FOOT R. & L. NIPPLE GOLD PIN

STEAM ONLY



12 Square Feet per Section

## DIMENSIONS OF SECTION

<b>A</b>	Distance from center to center	3 1/4"
<b>B</b>	Distance between ends of Pins	1/4"
<b>C</b>	Length of Pin	3/4"
<b>D</b>	Height of Section	9"
<b>E</b>	Length of Section	36"
<b>F</b>	Height of Section	8 1/2"
	Size of Right and Left Nipple	2"

Shipping weight, per Section, 62 lbs.

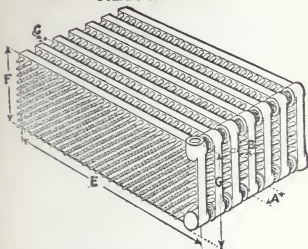
Supply or Head Section is tapped L. H. for R. & L. Nipple  
 Return or Drain Section is tapped R. H. for R. & L. Nipple

## REGULAR TAPPING

Supply	1 1/4"	Return	1 1/4"
Air Valve	3/4"		

Price \$0.27 per Square Foot

# RIGHT AND LEFT NIPPLE GOLD PIN STEAM OR WATER



## 15-FOOT R. & L. NIPPLE GOLD PIN

<b>F</b>	Height of Section.....	10"
<b>G</b>	Height of Section.....	11½"
Shipping weight, per Section, 77 lbs.		
15 Square Feet per Section		

## 20-FOOT R. & L. NIPPLE GOLD PIN

<b>F</b>	Height of Section.....	14"
<b>G</b>	Height of Section.....	15½"
Shipping weight, per Section, 106 lbs.		
20 Square Feet per Section		

## DIMENSIONS COMMON TO BOTH

<b>A</b>	Distance from center to center.....	3¼"
<b>B</b>	Distance between ends of Pins.....	¼"
<b>C</b>	Length of Pin.....	¾"
<b>E</b>	Length of Section.....	36"
Size of R. & L. Nipple.....		2"

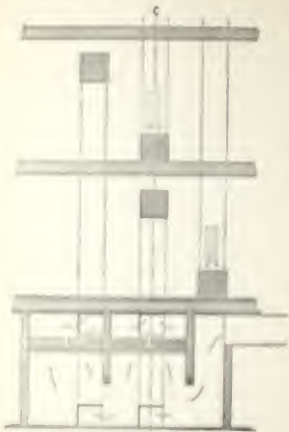
## REGULAR TAPPING

Supply.....	1½"	Return.....	1½"
Air Valves.....		⅜"	

Supply or Head Section is tapped L. H. for R. & L. Nipple  
Return or Drain Section is tapped R. H. for R. & L. Nipple

Price \$0.27 per Square Foot

# SCHOOL PIN



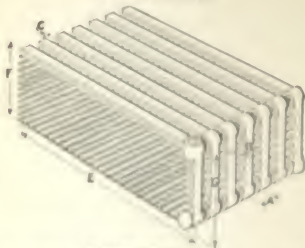
Section A-B

As used for warming and ventilating schoolhouses



# SCHOOL PIN

STEAM OR WATER



## 15 FOOT SCHOOL PIN

F	Height of Section	10"
G	Height of Section	11 1/2"

Shipping weight, per Section 32 lbs.  
 15 Square Feet per Section

## 20 FOOT SCHOOL PIN

F	Height of Section	10"
G	Height of Section	11 1/2"

Shipping weight, per Section 44 lbs.  
 20 Square Feet per Section

## DIMENSIONS COMMON TO BOTH

A	Distance from center to center	4"
B	Distance from center to center	4"
C	Length of Pin	1 1/2"
D	Length of Section	15"
E	Length of Section	20"
F	Distance of R. & L. Pipes	36"

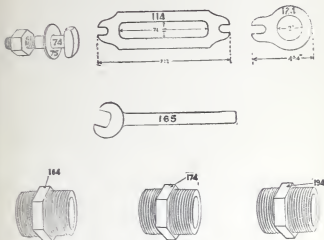
## BRILLANT TAPPING

Section	15'	20'
Weight	32 lbs.	44 lbs.

Each Section of radiator is made of 1/2" x 1/2" x 1/2" Steel

Price \$0.27 per Square Foot

## INDIRECT RADIATOR FITTINGS



## PRICE LIST

No.*	Name	Size	NET Price
74	Bolt with Nut.....		\$.02½
75	Washer for Bolt No. 74.....		.00½
114	Regular Pattern (paper) Gasket.....		.01
124	10" Flange Pin (paper) Gasket.....		.01
164	R. & L. Nipple for 12-foot Gold Pin.....	2" Hex.	.15
165	Wrench for Nipple No. 164.....	2" Hex.	1.25
174	R. & L. Nipple for School Pin.....	2" Hex.	.15
194	R. & L. Nipple for 15 & 20-foot Gold Pin	2" Hex.	.15

\*Catalog number of part.





RULES  
AND  
PRACTICAL  
DATA

## TABLE OF NET PRICES

Figured at Different Discounts for the Several Heights of Radiators

Discount	45" and 44"	36" and 37"	31" and 30"	25" and 24"	19"
	41c	42c	46c	50c	87c
15	\$ 30.5	\$ 31.5	\$ 34.5	\$ 35.5	\$ 41.5
20	30.4	31.4	34.4	35.4	41.4
25	29.9	30.9	33.9	34.9	40.9
30	29.4	30.4	33.4	34.4	40.4
35	28.9	29.9	32.9	33.9	39.9
40	28.4	29.4	32.4	33.4	39.4
45	27.9	28.9	31.9	32.9	38.9
50	27.4	28.4	31.4	32.4	38.4
55	26.9	27.9	30.9	31.9	37.9
60	26.4	27.4	30.4	31.4	37.4
65	25.9	26.9	29.9	30.9	36.9
70	25.4	26.4	29.4	30.4	36.4
75	24.9	25.9	28.9	29.9	35.9
80	24.4	25.4	28.4	29.4	35.4
85	23.9	24.9	27.9	28.9	34.9
90	23.4	24.4	27.4	28.4	34.4
95	22.9	23.9	26.9	27.9	33.9
100	22.4	23.4	26.4	27.4	33.4
105	21.9	22.9	25.9	26.9	32.9
110	21.4	22.4	25.4	26.4	32.4
115	20.9	21.9	24.9	25.9	31.9
120	20.4	21.4	24.4	25.4	31.4
125	19.9	20.9	23.9	24.9	30.9
130	19.4	20.4	23.4	24.4	30.4
135	18.9	19.9	22.9	23.9	29.9
140	18.4	19.4	22.4	23.4	29.4
145	17.9	18.9	21.9	22.9	28.9
150	17.4	18.4	21.4	22.4	28.4
155	16.9	17.9	20.9	21.9	27.9
160	16.4	17.4	20.4	21.4	27.4
165	15.9	16.9	19.9	20.9	26.9
170	15.4	16.4	19.4	20.4	26.4
175	14.9	15.9	18.9	19.9	25.9
180	14.4	15.4	18.4	19.4	25.4
185	13.9	14.9	17.9	18.9	24.9
190	13.4	14.4	17.4	18.4	24.4
195	12.9	13.9	16.9	17.9	23.9
200	12.4	13.4	16.4	17.4	23.4
205	11.9	12.9	15.9	16.9	22.9
210	11.4	12.4	15.4	16.4	22.4
215	10.9	11.9	14.9	15.9	21.9
220	10.4	11.4	14.4	15.4	21.4
225	9.9	10.9	13.9	14.9	20.9
230	9.4	10.4	13.4	14.4	20.4
235	8.9	9.9	12.9	13.9	19.9
240	8.4	9.4	12.4	13.4	19.4
245	7.9	8.9	11.9	12.9	18.9
250	7.4	8.4	11.4	12.4	18.4
255	6.9	7.9	10.9	11.9	17.9
260	6.4	7.4	10.4	11.4	17.4
265	5.9	6.9	9.9	10.9	16.9
270	5.4	6.4	9.4	10.4	16.4
275	4.9	5.9	8.9	9.9	15.9
280	4.4	5.4	8.4	9.4	15.4
285	3.9	4.9	7.9	8.9	14.9
290	3.4	4.4	7.4	8.4	14.4
295	2.9	3.9	6.9	7.9	13.9
300	2.4	3.4	6.4	7.4	13.4
305	1.9	2.9	5.9	6.9	12.9
310	1.4	2.4	5.4	6.4	12.4
315	0.9	1.9	4.9	5.9	11.9
320	0.4	1.4	4.4	5.4	11.4
325	0.9	1.9	3.9	4.9	10.9
330	0.4	1.4	3.4	4.4	10.4
335	0.9	1.9	2.9	3.9	9.9
340	0.4	1.4	2.4	3.4	9.4
345	0.9	1.9	1.9	2.9	8.9
350	0.4	1.4	1.4	2.4	8.4
355	0.9	1.9	0.9	1.9	7.9
360	0.4	1.4	0.4	1.4	7.4
365	0.9	1.9	0.9	1.9	6.9
370	0.4	1.4	0.4	1.4	6.4
375	0.9	1.9	0.9	1.9	5.9
380	0.4	1.4	0.4	1.4	5.4
385	0.9	1.9	0.9	1.9	4.9
390	0.4	1.4	0.4	1.4	4.4
395	0.9	1.9	0.9	1.9	3.9
400	0.4	1.4	0.4	1.4	3.4
405	0.9	1.9	0.9	1.9	2.9
410	0.4	1.4	0.4	1.4	2.4
415	0.9	1.9	0.9	1.9	1.9
420	0.4	1.4	0.4	1.4	1.4
425	0.9	1.9	0.9	1.9	0.9
430	0.4	1.4	0.4	1.4	0.4
435	0.9	1.9	0.9	1.9	0.9
440	0.4	1.4	0.4	1.4	0.4
445	0.9	1.9	0.9	1.9	0.9
450	0.4	1.4	0.4	1.4	0.4
455	0.9	1.9	0.9	1.9	0.9
460	0.4	1.4	0.4	1.4	0.4
465	0.9	1.9	0.9	1.9	0.9
470	0.4	1.4	0.4	1.4	0.4
475	0.9	1.9	0.9	1.9	0.9
480	0.4	1.4	0.4	1.4	0.4
485	0.9	1.9	0.9	1.9	0.9
490	0.4	1.4	0.4	1.4	0.4
495	0.9	1.9	0.9	1.9	0.9
500	0.4	1.4	0.4	1.4	0.4
505	0.9	1.9	0.9	1.9	0.9
510	0.4	1.4	0.4	1.4	0.4
515	0.9	1.9	0.9	1.9	0.9
520	0.4	1.4	0.4	1.4	0.4
525	0.9	1.9	0.9	1.9	0.9
530	0.4	1.4	0.4	1.4	0.4
535	0.9	1.9	0.9	1.9	0.9
540	0.4	1.4	0.4	1.4	0.4
545	0.9	1.9	0.9	1.9	0.9
550	0.4	1.4	0.4	1.4	0.4
555	0.9	1.9	0.9	1.9	0.9
560	0.4	1.4	0.4	1.4	0.4
565	0.9	1.9	0.9	1.9	0.9
570	0.4	1.4	0.4	1.4	0.4
575	0.9	1.9	0.9	1.9	0.9
580	0.4	1.4	0.4	1.4	0.4
585	0.9	1.9	0.9	1.9	0.9
590	0.4	1.4	0.4	1.4	0.4
595	0.9	1.9	0.9	1.9	0.9
600	0.4	1.4	0.4	1.4	0.4
605	0.9	1.9	0.9	1.9	0.9
610	0.4	1.4	0.4	1.4	0.4
615	0.9	1.9	0.9	1.9	0.9
620	0.4	1.4	0.4	1.4	0.4
625	0.9	1.9	0.9	1.9	0.9
630	0.4	1.4	0.4	1.4	0.4
635	0.9	1.9	0.9	1.9	0.9
640	0.4	1.4	0.4	1.4	0.4
645	0.9	1.9	0.9	1.9	0.9
650	0.4	1.4	0.4	1.4	0.4
655	0.9	1.9	0.9	1.9	0.9
660	0.4	1.4	0.4	1.4	0.4
665	0.9	1.9	0.9	1.9	0.9
670	0.4	1.4	0.4	1.4	0.4
675	0.9	1.9	0.9	1.9	0.9
680	0.4	1.4	0.4	1.4	0.4
685	0.9	1.9	0.9	1.9	0.9
690	0.4	1.4	0.4	1.4	0.4
695	0.9	1.9	0.9	1.9	0.9
700	0.4	1.4	0.4	1.4	0.4
705	0.9	1.9	0.9	1.9	0.9
710	0.4	1.4	0.4	1.4	0.4
715	0.9	1.9	0.9	1.9	0.9
720	0.4	1.4	0.4	1.4	0.4
725	0.9	1.9	0.9	1.9	0.9
730	0.4	1.4	0.4	1.4	0.4
735	0.9	1.9	0.9	1.9	0.9
740	0.4	1.4	0.4	1.4	0.4
745	0.9	1.9	0.9	1.9	0.9
750	0.4	1.4	0.4	1.4	0.4
755	0.9	1.9	0.9	1.9	0.9
760	0.4	1.4	0.4	1.4	0.4
765	0.9	1.9	0.9	1.9	0.9
770	0.4	1.4	0.4	1.4	0.4
775	0.9	1.9	0.9	1.9	0.9
780	0.4	1.4	0.4	1.4	0.4
785	0.9	1.9	0.9	1.9	0.9
790	0.4	1.4	0.4	1.4	0.4
795	0.9	1.9	0.9	1.9	0.9
800	0.4	1.4	0.4	1.4	0.4
805	0.9	1.9	0.9	1.9	0.9
810	0.4	1.4	0.4	1.4	0.4
815	0.9	1.9	0.9	1.9	0.9
820	0.4	1.4	0.4	1.4	0.4
825	0.9	1.9	0.9	1.9	0.9
830	0.4	1.4	0.4	1.4	0.4
835	0.9	1.9	0.9	1.9	0.9
840	0.4	1.4	0.4	1.4	0.4
845	0.9	1.9	0.9	1.9	0.9
850	0.4	1.4	0.4	1.4	0.4
855	0.9	1.9	0.9	1.9	0.9
860	0.4	1.4	0.4	1.4	0.4
865	0.9	1.9	0.9	1.9	0.9
870	0.4	1.4	0.4	1.4	0.4
875	0.9	1.9	0.9	1.9	0.9
880	0.4	1.4	0.4	1.4	0.4
885	0.9	1.9	0.9	1.9	0.9
890	0.4	1.4	0.4	1.4	0.4
895	0.9	1.9	0.9	1.9	0.9
900	0.4	1.4	0.4	1.4	0.4
905	0.9	1.9	0.9	1.9	0.9
910	0.4	1.4	0.4	1.4	0.4
915	0.9	1.9	0.9	1.9	0.9
920	0.4	1.4	0.4	1.4	0.4
925	0.9	1.9	0.9	1.9	0.9
930	0.4	1.4	0.4	1.4	0.4
935	0.9	1.9	0.9	1.9	0.9
940	0.4	1.4	0.4	1.4	0.4
945	0.9	1.9	0.9	1.9	0.9
950	0.4	1.4	0.4	1.4	0.4
955	0.9	1.9	0.9	1.9	0.9
960	0.4	1.4	0.4	1.4	0.4
965	0.9	1.9	0.9	1.9	0.9
970	0.4	1.4	0.4	1.4	0.4
975	0.9	1.9	0.9	1.9	0.9
980	0.4	1.4	0.4	1.4	0.4
985	0.9	1.9	0.9	1.9	0.9
990	0.4	1.4	0.4	1.4	0.4
995	0.9	1.9	0.9	1.9	0.9
1000	0.4	1.4	0.4	1.4	0.4

## TABLE OF NET PRICES

Figured at Different Discounts for the Several Heights of Radiators

Discount	18" 58c	16" 60c	14" 64c	12" 68c	Indirects 27c
25	\$ .435	\$ .45	\$ .48	\$ .51	\$ .2025
26	.4292	.444	.4736	.5032	.1998
27	.4234	.438	.4672	.4964	.1971
28	.4176	.432	.4608	.4896	.1944
29	.4118	.426	.4544	.4828	.1917
30	.406	.42	.448	.476	.189
31	.4002	.414	.4416	.4692	.1863
32	.3944	.408	.4352	.4624	.1836
33	.3886	.402	.4288	.4556	.1809
34	.3828	.396	.4224	.4488	.1782
35	.377	.39	.416	.442	.1755
36	.3712	.384	.4096	.4352	.1728
37	.3654	.378	.4032	.4284	.1701
38	.3596	.372	.3968	.4216	.1674
39	.3538	.366	.3904	.4148	.1647
40	.348	.36	.384	.408	.162
41	.3422	.354	.3776	.4012	.1593
42	.3364	.348	.3712	.3944	.1566
43	.3306	.342	.3648	.3876	.1539
44	.3248	.336	.3584	.3808	.1512
45	.319	.33	.352	.374	.1485
46	.3132	.324	.3456	.3672	.1458
47	.3074	.318	.3392	.3604	.1431
48	.3016	.312	.3328	.3536	.1404
49	.2958	.306	.3264	.3468	.1377
50	.29	.30	.32	.34	.135
51	.2842	.294	.3136	.3332	.1323
52	.2784	.288	.3072	.3264	.1296
53	.2726	.282	.3008	.3196	.1269
54	.2668	.276	.2944	.3128	.1242
55	.261	.27	.288	.306	.1215
56	.2552	.264	.2816	.2992	.1188
57	.2494	.258	.2752	.2924	.1161
58	.2436	.252	.2688	.2856	.1134
59	.2378	.246	.2624	.2788	.1107
60	.232	.24	.256	.272	.108
61	.2262	.234	.2496	.2652	.1053
62	.2204	.228	.2432	.2584	.1026
63	.2146	.222	.2368	.2516	.0999
64	.2088	.216	.2304	.2448	.0972
65	.203	.21	.224	.238	.0945
66	.1972	.204	.2176	.2312	.0918
67	.1914	.198	.2112	.2244	.0891
68	.1856	.192	.2048	.2176	.0864
69	.1798	.186	.1984	.2108	.0837
70	.174	.18	.192	.204	.081
71	.1682	.174	.1856	.1972	.0783
72	.1624	.168	.1792	.1904	.0756
73	.1566	.162	.1728	.1836	.0729
74	.1508	.156	.1664	.1768	.0702
75	.145	.15	.16	.17	.0675

## WEIGHTS AND MEASURES

## MEASURE OF LENGTH

4	In	make	1 Hand	3	Feet	make	1 Yard
12	In	"	1 Link	5 1/2	Yds	"	1 Rod or Pole
18	In	"	1 Cubit	40	Fath	"	1 Fathom
3	In	"	1 Foot	8	Fat	"	1 Mile
5	Fl	"	1 Fathom	5280	Miles	"	1 League
1 Degree contains 60 Geographical Miles.							
				1000 Yards = 1 Mile.			
				5280 Feet = 1 Mile.			

## MEASURE OF SURFACE

144	Square Inches	make	1 Square Foot
9	Square Feet	"	1 Square Yard
36	Square Yards	"	1 Acre, Part of Mile
484	Square Rods	"	1 Acre
4	Rods	"	1 Acre
160	Square Chains	"	1 Acre
640	Acres	"	1 Square Mile
Surveyor's Chain equals to 33 Yards or 100 Links.			
4356 Square Feet make 1 Acre.			
43560 Square Feet make 1 Acre.			

## MEASURE OF SOLIDITY

1728	Cubic Feet	make	1 Cubic Yard
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## AVOIRDUPOIS WEIGHT

16	Ounces	make	1 Pound
7000	Pounds	make	1 Ton
35	Grains	make	1 Pennyweight
24	Pennyweights	make	1 Ounce
480	Grains	make	1 Ounce
3584	Grains	make	1 Pound
7680	Grains	make	1 Pound
14112	Grains	make	1 Pound
28224	Grains	make	1 Pound
56448	Grains	make	1 Pound
112896	Grains	make	1 Pound
225792	Grains	make	1 Pound
451584	Grains	make	1 Pound
903168	Grains	make	1 Pound
1806336	Grains	make	1 Pound
3612672	Grains	make	1 Pound
7225344	Grains	make	1 Pound
14450688	Grains	make	1 Pound
28901376	Grains	make	1 Pound
57802752	Grains	make	1 Pound
115605504	Grains	make	1 Pound
231211008	Grains	make	1 Pound
462422016	Grains	make	1 Pound
924844032	Grains	make	1 Pound
1849688064	Grains	make	1 Pound
3699376128	Grains	make	1 Pound
7398752256	Grains	make	1 Pound
14797504512	Grains	make	1 Pound
29595009024	Grains	make	1 Pound
59190018048	Grains	make	1 Pound
118380036096	Grains	make	1 Pound
236760072192	Grains	make	1 Pound
473520144384	Grains	make	1 Pound
947040288768	Grains	make	1 Pound
1894080577536	Grains	make	1 Pound
3788161155072	Grains	make	1 Pound
7576322310144	Grains	make	1 Pound
15152644620288	Grains	make	1 Pound
30305289240576	Grains	make	1 Pound
60610578481152	Grains	make	1 Pound
121221156962304	Grains	make	1 Pound
242442313924608	Grains	make	1 Pound
484884627849216	Grains	make	1 Pound
969769255698432	Grains	make	1 Pound
1939538511396864	Grains	make	1 Pound
3879077022793728	Grains	make	1 Pound
7758154045587456	Grains	make	1 Pound
15516308091174912	Grains	make	1 Pound
31032616182349824	Grains	make	1 Pound
62065232364699648	Grains	make	1 Pound
124130464729399296	Grains	make	1 Pound
248260929458798592	Grains	make	1 Pound
496521858917597184	Grains	make	1 Pound
993043717835194368	Grains	make	1 Pound
1986087435670388736	Grains	make	1 Pound
3972174871340777472	Grains	make	1 Pound
7944349742681554944	Grains	make	1 Pound
15888699485363109888	Grains	make	1 Pound
31777398970726219776	Grains	make	1 Pound
63554797941452439552	Grains	make	1 Pound
127109595882904879104	Grains	make	1 Pound
254219191765809758208	Grains	make	1 Pound
508438383531619516416	Grains	make	1 Pound
1016876767063239032832	Grains	make	1 Pound
2033753534126478065664	Grains	make	1 Pound
4067507068252956131328	Grains	make	1 Pound
8135014136505912262656	Grains	make	1 Pound
16270028273011824525312	Grains	make	1 Pound
32540056546023649050624	Grains	make	1 Pound
65080113092047298101248	Grains	make	1 Pound
130160226184094596202496	Grains	make	1 Pound
260320452368189192404992	Grains	make	1 Pound
520640904736378384809984	Grains	make	1 Pound
1041281809472756769619968	Grains	make	1 Pound
2082563618945513539239936	Grains	make	1 Pound
4165127237891027078479872	Grains	make	1 Pound
8330254475782054156959744	Grains	make	1 Pound
16660508951564108313919488	Grains	make	1 Pound
33321017903128216627838976	Grains	make	1 Pound
66642035806256433255677952	Grains	make	1 Pound
133284071612512866511355904	Grains	make	1 Pound
266568143225025733022711808	Grains	make	1 Pound
533136286450051466045423616	Grains	make	1 Pound
1066272572900102932090847232	Grains	make	1 Pound
2132545145800205864181694464	Grains	make	1 Pound
4265090291600411728363388928	Grains	make	1 Pound
8530180583200823456726777856	Grains	make	1 Pound
17060361166401646913453555712	Grains	make	1 Pound
34120722332803293826907111424	Grains	make	1 Pound
68241444665606587653814222848	Grains	make	1 Pound
136482889331213175307628445696	Grains	make	1 Pound
272965778662426350615256891392	Grains	make	1 Pound
545931557324852701230513782784	Grains	make	1 Pound
1091863114649705402461027565568	Grains	make	1 Pound
2183726229299410804922055131136	Grains	make	1 Pound
4367452458598821609844110262272	Grains	make	1 Pound
8734904917197643219688220524544	Grains	make	1 Pound
17469809834395286439376441049088	Grains	make	1 Pound
34939619668790572878752882098176	Grains	make	1 Pound
69879239337581145757505764196352	Grains	make	1 Pound
139758478675162291515011528392704	Grains	make	1 Pound
279516957350324583030023056785408	Grains	make	1 Pound
559033914700649166060046113570816	Grains	make	1 Pound
1118067829401298332120092227141632	Grains	make	1 Pound
2236135658802596664240184454283264	Grains	make	1 Pound
4472271317605193328480368908566528	Grains	make	1 Pound
8944542635210386656960737817133056	Grains	make	1 Pound
17889085270420773313921475634266112	Grains	make	1 Pound
35778170540841546627842951268532224	Grains	make	1 Pound
71556341081683093255685902537064448	Grains	make	1 Pound
143112682163366186511371805074128896	Grains	make	1 Pound
286225364326732373022743610148257792	Grains	make	1 Pound
572450728653464746045487220296515584	Grains	make	1 Pound
1144901457306929492090974440593031168	Grains	make	1 Pound
2289802914613858984181948881186062336	Grains	make	1 Pound
4579605829227717968363897762372124672	Grains	make	1 Pound
9159211658455435936727795524744249344	Grains	make	1 Pound
18318423316910871873455591049488498688	Grains	make	1 Pound
36636846633821743746911182098976997376	Grains	make	1 Pound
73273693267643487493822364197953994752	Grains	make	1 Pound
146547386535286974987644728395907989504	Grains	make	1 Pound
293094773070573949975289456791815979008	Grains	make	1 Pound
586189546141147899950578913583631958016	Grains	make	1 Pound
1172379092282295799901157827167263916032	Grains	make	1 Pound
2344758184564591599802315654334527832064	Grains	make	1 Pound
4689516369129183199604631308669055664128	Grains	make	1 Pound
9379032738258366399209262617338111328256	Grains	make	1 Pound
18758065476516732798418525234676222656512	Grains	make	1 Pound
37516130953033465596837050469352445313024	Grains	make	1 Pound
75032261906066931193674100938704890626048	Grains	make	1 Pound
150064523812133862387348201877409781252096	Grains	make	1 Pound
300129047624267724774696403754819562504192	Grains	make	1 Pound
600258095248535449549392807509639125008384	Grains	make	1 Pound
1200516190497070899098785615019278250016768	Grains	make	1 Pound
2401032380994141798197571230038556500033536	Grains	make	1 Pound
4802064761988283596395142460077113000067072	Grains	make	1 Pound
9604129523976567192790284920154226000134144	Grains	make	1 Pound
19208259047953134385580569840308452000268288	Grains	make	1 Pound
38416518095906268771161139680616904000536576	Grains	make	1 Pound
76833036191812537542322279361233808001073152	Grains	make	1 Pound
153666072383625075084644558722467616002146304	Grains	make	1 Pound
307332144767250150169289117444935232004292608	Grains	make	1 Pound
614664289534500300338578234889870464008585216	Grains	make	1 Pound
1229328579069000600677156469779740928017170432	Grains	make	1 Pound
2458657158138001201354312939559481856034340864	Grains	make	1 Pound
4917314316276002402708625879118963712068681728	Grains	make	1 Pound
9834628632552004805417251758237927424137363456	Grains	make	1 Pound
19669257265104009610834503516475854848274726912	Grains	make	1 Pound
39338514530208019221669007032951709696549453824	Grains	make	1 Pound
78677029060416038443338014065903419393098907648	Grains	make	1 Pound
157354058120832076886676028131806838786197815296	Grains	make	1 Pound
314708116241664153773352056263613677572395630592	Grains	make	1 Pound
629416232483328307546704112527227355144791261184	Grains	make	1 Pound
1258832464966656615093408225054454710289582522368	Grains	make	1 Pound
2517664929933313230186816450108909420579165044736	Grains	make	1 Pound
5035329859866626460373632900217818841158330089472	Grains	make	1 Pound
10070659719733252920747265800435637682316660178944	Grains	make	1 Pound
20141319439466505841494531600871275364633320357888	Grains	make	1 Pound
40282638878933011682989063201742550729266640715776	Grains	make	1 Pound
80565277757866023365978126403485101458533281431552	Grains	make	1 Pound
161130555515732046731956252806970202917066562863104	Grains	make	1 Pound
322261111031464093463912505613940405834133125726208	Grains	make	1 Pound
644522222062928186927825011227880811668266251452416	Grains	make	1 Pound
1289044444125856373855650022455761623336532502904832	Grains	make	1 Pound
2578088888251712747711300044911523246673065005809664	Grains	make	1 Pound
5156177776503425495422600089823046493346130011619328	Grains	make	1 Pound
10312355553006850990845200179646092986692260023238656	Grains	make	1 Pound
20624711106013701981690400359292185973384520046477312	Grains	make	1 Pound
41249422212027403963380800718584371946769040092954624	Grains	make	1 Pound
82498844424054807926761601437168743893538080185909248	Grains	make	1 Pound
164997688848109615853523202874337487787076160371818496	Grains	make	1 Pound
329995377696219231707046405748674975574152320743636992	Grains	make	1 Pound
659990755392438463414092811497349951148304641487273984	Grains	make	1 Pound
1319981510784876926828185622994699902296609282974547968	Grains	make	1 Pound
2639963021569753853656371245989399804593218565949095936	Grains	make	1 Pound
5279926043139507707312742491978799609186437131898191872	Grains	make	1 Pound
10559852086279015414625484983957599218372874263796383744	Grains	make	1 Pound
21119704172558030829250969967915198436745748527592767488	Grains	make	1 Pound
42239408345116061658501939935830396873491497055185534976	Grains	make	1 Pound
84478816690232123317003879871660793746982994110371069952	Grains	make	1 Pound
168957633380464246634007759743321587493965988220742139904	Grains	make	1 Pound

## METRIC SYSTEM

## MEASURES OF LENGTH

METRIC DENOMINATIONS.		EQUIVALENTS.
Myriameter.	10,000 Meters.	6,213.7 miles.
Kilometer.	1,000 "	0.62137 "
Hectometer.	100 "	328.082 feet.
Dekameter.	10 "	12.800 "
Meter.	1 "	3.2809 "
Decimeter.	1-10 "	3.937 inches
Centimeter.	1-100 "	0.3937 "
Millimeter.	1-1000 "	0.03937 "

## MEASURES OF SURFACE

METRIC DENOMINATIONS.		EQUIVALENTS.
Hectars.	10,000 Square Meters.	2.471 Acres.
Are.	100 "	119.6 Square Yards.
Centars.	1 "	107.645 Square Feet.

## MEASURES OF CAPACITY

METRIC DENOMINATIONS.		EQUIVALENTS.	
		DRY MEASURE.	WINE MEASURE.
Kiloliter.	1,000 Liters.	1.358 Cubic Yards.	264.17 Gallons
Hectoliter.	100 "	2 Bu. and 3.35 Pecks.	26.417 "
Dekaliter.	10 "	3.08 Quarts.	2.6417 "
Liter.	1 "	0.908 "	1.0567 Quarts.
Deciliter.	1-10 "	6.9032 Cubic Inches.	0.845 Gall.
Centiliter.	1-100 "	0.6002 "	1.65 Fluid Oz.
Milliliter.	1-1000 "	.061 "	.21 Dr.

## WEIGHTS

METRIC DENOMINATIONS.		EQUIVALENTS.		
		AVOIRDOUPES WT.		QUANTITY OF WATER.
Millier.	1,000,000 Grams.	2204.6	Lbs.	1 Cubic Meter.
Cental.	100,000 "	220.46	"	1 Hectoliter.
Myriagram.	10,000 "	22.046	"	1 Dekaliter.
Kilogram.	1,000 "	2.2046	"	1 Liter.
Hekagram.	100 "	3.5274	Ozs.	1 Deciliter.
Dekagram.	10 "	.3527	"	1 Centiliter.
Gram.	1 "	15.432	Gr.	1 Milliliter.
Decigram.	1-10 "	1.5472	"	1 "
Centigram.	1-100 "	.1543	"	.01 "
Milligram.	1-1000 "	.0154	"	.001 "

# AREAS AND CIRCUMFERENCES OF CIRCLES

Diam.	Circum.	Area	Diam.	Circum.	Area
$\frac{1}{4}$	.7854	.04909	19.	59.6904	283.529
$\frac{1}{2}$	1.5708	.19635	$\frac{1}{2}$	61.2612	298.648
$\frac{3}{4}$	2.3562	.44178	20.	62.832	314.16
1.	3.1416	.7854	$\frac{1}{4}$	64.4028	330.064
$\frac{1}{2}$	4.7124	1.17671	21	65.9736	346.361
2	6.2832	3.1416	$\frac{1}{2}$	67.5444	363.051
$\frac{1}{2}$	7.854	4.9087	22.	69.1152	380.134
3.	9.4248	7.0686	$\frac{1}{4}$	70.686	397.608
$\frac{1}{2}$	10.9956	9.6211	23.	72.2568	415.477
4	12.5664	12.5664	$\frac{1}{2}$	73.8276	433.731
$\frac{1}{2}$	14.1372	15.9043	24	75.3984	452.39
5	15.708	19.635	$\frac{1}{4}$	76.9692	471.436
$\frac{1}{2}$	17.2788	23.7583	25	78.54	490.875
6.	18.8496	28.2744	$\frac{1}{2}$	80.1108	510.706
$\frac{1}{2}$	20.4204	33.1831	26	81.6816	530.93
7	21.9912	38.4846	$\frac{1}{4}$	83.2524	551.547
$\frac{1}{2}$	23.562	44.1787	27.	84.8232	572.557
8	25.1328	50.2656	$\frac{1}{2}$	86.394	593.958
$\frac{1}{2}$	26.7036	56.7451	28	87.9648	615.754
9	28.2744	63.6174	$\frac{1}{4}$	89.5356	637.941
$\frac{1}{2}$	29.8452	70.8823	29	91.1064	660.521
10	31.416	78.54	$\frac{1}{2}$	92.6772	683.494
$\frac{1}{2}$	32.9868	86.59	30	94.248	706.86
11	34.5576	95.0334	$\frac{1}{4}$	95.8188	730.618
$\frac{1}{2}$	36.1284	103.8691	31	97.3896	754.79
12	37.6992	113.098	$\frac{1}{2}$	98.9604	779.313
$\frac{1}{2}$	39.27	122.718	32	100.5312	804.25
13	40.8408	132.733	$\frac{1}{4}$	102.102	829.578
$\frac{1}{2}$	42.4116	143.139	33	103.673	855.301
14	43.9824	153.938	$\frac{1}{2}$	105.244	881.415
$\frac{1}{2}$	45.5532	165.13	34	106.814	907.922
15	47.124	176.715	$\frac{1}{4}$	108.385	934.822
$\frac{1}{2}$	48.6948	188.692	35	109.956	962.115
16	50.2656	201.062	$\frac{1}{2}$	111.527	989.8
$\frac{1}{2}$	51.8364	213.825	36	113.098	1017.878
17	53.4072	226.981	$\frac{1}{4}$	114.668	1046.349
$\frac{1}{2}$	54.978	240.528	37	116.239	1075.213
18	56.5488	254.467	$\frac{1}{2}$	117.81	1104.469
$\frac{1}{2}$	58.1196	268.803	38	119.381	1134.118

# AREAS AND CIRCUMFERENCES OF CIRCLES

Diam.	Circum.	Area	Diam.	Circum.	Area
38. $\frac{1}{2}$	120.952	1164.159	57.	179.071	2551.76
39.	122.522	1194.593	57. $\frac{1}{2}$	180.642	2596.73
39. $\frac{1}{2}$	124.093	1225.42	58.	182.213	2642.09
40.	125.664	1256.64	58. $\frac{1}{2}$	183.784	2687.84
40. $\frac{1}{2}$	127.235	1288.25	59.	185.354	2733.98
41.	128.806	1320.26	59. $\frac{1}{2}$	186.925	2780.51
41. $\frac{1}{2}$	130.376	1352.65	60.	188.496	2827.44
42.	131.947	1385.44	60. $\frac{1}{2}$	190.067	2874.76
42. $\frac{1}{2}$	133.518	1418.63	61.	191.638	2922.47
43.	135.089	1452.21	61. $\frac{1}{2}$	193.208	2970.58
43. $\frac{1}{2}$	136.66	1486.17	62.	194.779	3019.08
44.	138.23	1520.53	62. $\frac{1}{2}$	196.35	3067.97
44. $\frac{1}{2}$	139.801	1555.28	63.	197.921	3117.25
45.	141.372	1590.43	63. $\frac{1}{2}$	199.492	3166.93
45. $\frac{1}{2}$	142.943	1625.97	64.	201.062	3217.
46.	144.514	1661.91	64. $\frac{1}{2}$	202.633	3267.46
46. $\frac{1}{2}$	146.084	1698.23	65.	204.204	3318.31
47.	147.655	1734.95	65. $\frac{1}{2}$	205.775	3369.56
47. $\frac{1}{2}$	149.226	1772.05	66.	207.346	3421.2
48.	150.797	1809.56	66. $\frac{1}{2}$	208.916	3473.24
48. $\frac{1}{2}$	152.368	1847.45	67.	210.487	3525.66
49.	153.938	1885.74	67. $\frac{1}{2}$	212.058	3578.48
49. $\frac{1}{2}$	155.509	1924.42	68.	213.629	3631.69
50.	157.08	1963.5	68. $\frac{1}{2}$	215.2	3685.29
50. $\frac{1}{2}$	158.651	2002.97	69.	216.77	3739.29
51.	160.222	2042.82	69. $\frac{1}{2}$	218.341	3793.68
51. $\frac{1}{2}$	161.792	2083.08	70.	219.912	3848.46
52.	163.363	2123.72	70. $\frac{1}{2}$	221.483	3903.63
52. $\frac{1}{2}$	164.934	2164.76	71.	223.054	3959.2
53.	166.505	2206.19	71. $\frac{1}{2}$	224.624	4015.16
53. $\frac{1}{2}$	168.076	2248.01	72.	226.195	4071.51
54.	169.646	2290.23	72. $\frac{1}{2}$	227.766	4128.26
54. $\frac{1}{2}$	171.217	2332.83	73.	229.337	4185.4
55.	172.788	2375.83	73. $\frac{1}{2}$	230.908	4242.93
55. $\frac{1}{2}$	174.359	2419.22	74.	232.478	4300.85
56.	175.93	2463.01	74. $\frac{1}{2}$	234.049	4359.17
56. $\frac{1}{2}$	177.5	2507.19	75.	235.62	4417.87

## RELATIVE PROPORTIONS OF A WARMING APPARATUS

Sq. Feet of Heating Surface	Sq. Feet of Grate Surface	Size of Flue, Square Inches	Sq. Feet of Radia- tion	SURFACE TO CONTENTS		
				1:50	1:70	1:90
67	3.5	96	400	20,000	28,000	36,000
83	4	96	500	25,000	35,000	45,000
116	5.8	96	700	35,000	49,000	63,000
167	8.3	110	1,000	50,000	70,000	90,000
250	12.5	150	1,500	75,000	105,000	135,000
333	16.5	195	2,000	100,000	140,000	180,000
416	15.5	248	2,500	125,000	175,000	225,000
500	18.6	300	3,000	150,000	210,000	270,000
584	21.6	348	3,500	175,000	245,000	315,000
666	24.5	398	4,000	200,000	280,000	360,000
750	27.5	445	4,500	225,000	315,000	405,000
834	26	485	5,000	250,000	350,000	450,000
916	28.5	530	5,500	275,000	385,000	495,000
1,000	31	575	6,000	300,000	420,000	540,000
1,083	33.5	620	6,500	325,000	455,000	585,000
1,167	36	665	7,000	350,000	490,000	630,000
1,250	38.5	715	7,500	375,000	525,000	675,000
1,333	41	760	8,000	400,000	560,000	720,000
1,416	43.5	810	8,500	425,000	595,000	765,000
1,500	45.5	860	9,000	450,000	630,000	810,000
1,583	48	910	9,500	475,000	665,000	855,000
1,666	50	955	10,000	500,000	700,000	900,000

This table is intended to show the existing relations between the different parts of a plant for warming. It will be understood that the figures in the above are not intended to indicate a fixed and unvarying relation existing between any two parts, but are meant to approximate such proportions as will occur in an average job working under average conditions.



## WROUGHT IRON WELDED PIPE

DIMENSIONS, WEIGHTS, ETC., OF STANDARD SIZES FOR STEAM, GAS, WATER, OIL, ETC.

Inside Diameter	Outside Diameter	External Circumference	Length of Pipe per Sq. Ft. of Outside Surface	Internal Area	External Area	Length of Pipe Containing One Cubic Foot	Weight per Foot of Length	No. of Threads per Inch of Screw	Contents in Gallons per Foot	Weights of Water per Foot of Length
Inches	Inches	Inches	Feet	Inches	Inches	Feet	Lbs.			Lbs.
$\frac{1}{8}$	.40	1.272	9.44	.012	.129	2500.	.24	27	.0006	.005
$\frac{1}{4}$	.54	1.696	7.075	.049	.229	1385.	.42	18	.0026	.021
$\frac{3}{8}$	.67	2.121	5.657	.110	.358	751.5	.56	14	.0057	.047
$\frac{1}{2}$	.84	2.652	4.502	.196	.554	472.4	.84	14	.0102	.085
$\frac{5}{8}$	1.05	3.299	3.637	.441	.866	270.	1.12	11 $\frac{1}{2}$	.0230	.190
$\frac{3}{4}$	1.31	4.134	2.903	.785	1.357	166.9	1.67	11 $\frac{1}{2}$	.0408	.349
1	1.66	5.215	2.301	1.227	2.164	96.25	2.25	11 $\frac{1}{2}$	.0638	.527
1 $\frac{1}{8}$	1.9	5.969	2.01	1.767	2.835	70.65	2.69	11 $\frac{1}{2}$	.0918	.760
1 $\frac{1}{2}$	2.37	7.461	1.611	3.141	4.430	42.36	3.66	11 $\frac{1}{2}$	.1632	1.356
2	2.87	9.032	1.328	4.908	6.491	30.11	5.77	8	.2550	2.116
2 $\frac{1}{2}$	3.5	10.996	1.091	7.068	9.621	19.49	7.54	8	.3673	3.049
3	4.	12.566	.955	9.621	12.566	14.56	9.05	8	.4998	4.155
3 $\frac{1}{2}$	4.5	14.137	.849	12.566	15.904	11.31	10.72	8	.6528	5.405
4	5.	15.708	.765	15.904	19.635	9.03	12.49	8	.8263	6.851
4 $\frac{1}{2}$	5.56	17.475	.629	19.635	24.299	7.20	14.56	8	1.020	8.500
5	6.62	20.813	.577	28.274	34.471	4.98	18.76	8	1.469	12.312
6	7.62	23.954	.505	38.484	45.663	3.72	23.41	8	1.999	16.662
7	8.62	27.096	.444	50.265	58.426	2.88	28.34	8	2.611	21.750
8	9.68	30.433	.394	63.617	73.715	2.26	34.67	8	3.300	27.500
9	10.75	33.772	.355	78.540	90.792	1.80	40.64	8	4.081	34.000

\*The Standard U. S. gallon of 231 cubic inches

# TABLE OF EXPANSION OF WROUGHT IRON PIPE

Temperature of the Air when the Pipe is fitted	Length of Pipe when fitted	LENGTH OF PIPE WHEN HEATED TO			
		215 Degrees	265 Degrees	297 Degrees	338 Degrees
Deg. Fahr.	Feet	Feet Inches	Feet Inches	Feet Inches	Feet Inches
0	100	100 1.72	100 2.12	100 2.31	100 2.70
32	100	100 1.47	100 1.78	100 2.12	100 2.45
64	100	100 1.21	100 1.61	100 1.87	100 2.19

## REGISTERS

Size of Opening	Capacity in Sq. Inches	Size of Opening	Capacity in Sq. Inches	Size of Opening	Capacity in Sq. Inches
6 x 10	40	10 x 14	93	20 x 20	267
8 x 10	53	10 x 16	107	20 x 24	320
8 x 12	64	12 x 15	120	20 x 26	347
8 x 15	80	12 x 19	152	21 x 29	406
9 x 12	72	14 x 22	205	27 x 27	486
9 x 14	84	15 x 25	250	27 x 38	684
10 x 12	80	16 x 24	256	30 x 30	600

## ROUND REGISTERS

Size of Opening	Capacity in Sq. Inches	Size of Opening	Capacity in Sq. Inches	Size of Opening	Capacity in Sq. Inches
7 in.	26	12 in.	75	20 in.	209
8 "	33	14 "	103	24 "	301
9 "	42	16 "	134	30 "	471
10 "	52	18 "	169	36 "	679

## IRON PIPE SIZES OF BRASS PIPE

Made to Correspond with Iron Tubes and Fit Iron Tube Fittings

## LIST OF SIZES, LENGTHS, ETC.

OUTSIDE DIAMETER	SAME AS IRON SIZE	WEIGHT PER FOOT	
		Brass	Copper
13-32 In. =	1-8 In. =	.30 Pounds =	.31 Pounds.
9-16 " =	1-4 " =	.43 " =	.45 "
11-16 " =	3-8 " =	.58 " =	.61 "
13-16 " =	1-2 " =	.80 " =	.84 "
1 1-16 " =	3-4 " =	1.17 " =	1.23 "
1 5-16 " =	1 " =	1.67 " =	1.75 "
1 5-8 " =	1 1-4 " =	2.42 " =	2.54 "
1 7-8 " =	1 1-2 " =	2.92 " =	3.07 "
2 3-8 " =	2 " =	4.17 " =	4.38 "
2 7-8 " =	2 1-2 " =	5. " =	5.25 "
3 1-2 " =	3 " =	8. " =	8.40 "
4 " =	3 1-2 " =	10. " =	10.50 "
4 1-2 " =	4 " =	12. " =	12.00 "

## TABLE OF DECIMAL EQUIVALENTS

Of 8ths, 16ths, 32nds and 64ths of an Inch

8ths	32nds	64ths	64ths
$\frac{1}{8}$ = .125	$\frac{1}{32}$ = .03125	$\frac{1}{64}$ = .015625	$\frac{1}{64}$ = .015625
$\frac{1}{4}$ = .250	$\frac{2}{32}$ = .0625	$\frac{2}{64}$ = .03125	$\frac{2}{64}$ = .03125
$\frac{3}{8}$ = .375	$\frac{3}{32}$ = .09375	$\frac{3}{64}$ = .046875	$\frac{3}{64}$ = .046875
$\frac{1}{2}$ = .500	$\frac{4}{32}$ = .125	$\frac{4}{64}$ = .0625	$\frac{4}{64}$ = .0625
$\frac{5}{8}$ = .625	$\frac{5}{32}$ = .15625	$\frac{5}{64}$ = .078125	$\frac{5}{64}$ = .078125
$\frac{3}{4}$ = .750	$\frac{6}{32}$ = .1875	$\frac{6}{64}$ = .09375	$\frac{6}{64}$ = .09375
$\frac{7}{8}$ = .875	$\frac{7}{32}$ = .21875	$\frac{7}{64}$ = .109375	$\frac{7}{64}$ = .109375
	$\frac{8}{32}$ = .250	$\frac{8}{64}$ = .125	$\frac{8}{64}$ = .125
	$\frac{9}{32}$ = .28125	$\frac{9}{64}$ = .140625	$\frac{9}{64}$ = .140625
	$\frac{10}{32}$ = .3125	$\frac{10}{64}$ = .15625	$\frac{10}{64}$ = .15625
	$\frac{11}{32}$ = .34375	$\frac{11}{64}$ = .171875	$\frac{11}{64}$ = .171875
	$\frac{12}{32}$ = .375	$\frac{12}{64}$ = .1875	$\frac{12}{64}$ = .1875
	$\frac{13}{32}$ = .40625	$\frac{13}{64}$ = .203125	$\frac{13}{64}$ = .203125
	$\frac{14}{32}$ = .4375	$\frac{14}{64}$ = .21875	$\frac{14}{64}$ = .21875
	$\frac{15}{32}$ = .46875	$\frac{15}{64}$ = .234375	$\frac{15}{64}$ = .234375
	$\frac{16}{32}$ = .500	$\frac{16}{64}$ = .250	$\frac{16}{64}$ = .250
	$\frac{17}{32}$ = .53125	$\frac{17}{64}$ = .265625	$\frac{17}{64}$ = .265625
	$\frac{18}{32}$ = .5625	$\frac{18}{64}$ = .28125	$\frac{18}{64}$ = .28125
	$\frac{19}{32}$ = .59375	$\frac{19}{64}$ = .296875	$\frac{19}{64}$ = .296875
	$\frac{20}{32}$ = .625	$\frac{20}{64}$ = .3125	$\frac{20}{64}$ = .3125
	$\frac{21}{32}$ = .65625	$\frac{21}{64}$ = .328125	$\frac{21}{64}$ = .328125
	$\frac{22}{32}$ = .6875	$\frac{22}{64}$ = .34375	$\frac{22}{64}$ = .34375
	$\frac{23}{32}$ = .71875	$\frac{23}{64}$ = .359375	$\frac{23}{64}$ = .359375
	$\frac{24}{32}$ = .750	$\frac{24}{64}$ = .375	$\frac{24}{64}$ = .375
	$\frac{25}{32}$ = .78125	$\frac{25}{64}$ = .390625	$\frac{25}{64}$ = .390625
	$\frac{26}{32}$ = .8125	$\frac{26}{64}$ = .40625	$\frac{26}{64}$ = .40625
	$\frac{27}{32}$ = .84375	$\frac{27}{64}$ = .421875	$\frac{27}{64}$ = .421875
	$\frac{28}{32}$ = .875	$\frac{28}{64}$ = .4375	$\frac{28}{64}$ = .4375
	$\frac{29}{32}$ = .90625	$\frac{29}{64}$ = .453125	$\frac{29}{64}$ = .453125
	$\frac{30}{32}$ = .9375	$\frac{30}{64}$ = .46875	$\frac{30}{64}$ = .46875
		$\frac{31}{64}$ = .484375	$\frac{31}{64}$ = .484375

## THE MOVEMENT OF WARM AIR IN FLUES

The power that causes the upward motion of heated air in flues, is relatively small, being merely the difference in weight between equal columns of air at different temperatures. The colder air forces the warmer column upward with a force proportionate to this difference in weight, and with a velocity equal to that acquired by a body falling through a space equal to the difference in height that would be occupied by two columns of equal weight but of different temperatures.

According to the known law of gravitation, the velocity will be approximately equal to eight (8) times the square root of the height of descent in decimals of a foot. The discharge of air under the above conditions, however, is subject to certain corrections for friction, etc., and in general practice a deduction of one fourth ( $\frac{1}{4}$ ) is made to represent the true rate of discharge.

Opposite are two tables, the first showing the discharge of air from a flue one foot cross section and one foot high, for given differences in temperature, with corrections for friction. The second table shows the square root of different heights of flues, and is a multiplier for the first table. Combining the two tables to meet existing conditions the total discharge of air from any flue may be estimated.

For example: what is the discharge of air from a flue 15 feet high, with an area of 2 square feet, when the inside temperature is  $72^{\circ}$  and the outside temperature is  $42^{\circ}$  Fahrenheit? The difference of temperature between the air in the flue and that outside is  $30^{\circ}$ , and by reference to table No. 1, we find that the discharge of air from a flue 1 foot high, and 1 square foot cross section, for this difference in temperature is 88 cubic feet per minute. Multiplying this by 2 feet, the area of the flue in question, and by the square root of 15 (table No. 2) for the height, we get 681.12, which is the discharge per minute in cubic feet, under the above conditions.

## \*TABLE No. 1

The discharge of air per minute from a flue one square foot in section and one foot high at different temperatures

## Excess of Temperature of Air in Flue over Outside Air

Temperature of Outside Air	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°
	0°	38	53	65	76	84	92	100	106	113	119	125	130	136	141
	12°	37	53	63	75	83	91	98	105	111	118	124	128	134	139
	22°	37	52	62	74	82	90	97	104	110	117	122	127	132	137
	32°	36	51	62	73	81	89	96	103	109	115	120	126	131	136
	42°	36	51	62	72	80	88	95	102	108	114	119	125	130	135
	52°	36	50	62	71	80	87	94	101	107	113	118	124	129	134
	62°	35	50	61	71	79	86	93	100	106	112	117	123	127	133
	72°	35	49	61	70	78	85	92	99	105	111	116	121	126	131
	82°	35	49	60	69	77	85	91	98	104	110	115	120	125	130
92°	34	48	60	69	77	84	90	97	103	109	114	119	124	128	133
	102°	34	48	59	68	76	83	90	96	102	108	113	118	123	127

## \*TABLE No. 2

Square Roots of Heights of Flues. Multipliers for above Table

Column H = Height of Flue in Feet	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
	1	1	10	3.16	19	4.36	28	5.29	37	6.08	46	6.78	55	7.42	64
	2	1.41	11	3.32	20	4.47	29	5.39	38	6.16	47	6.86	56	7.48	65
	3	1.73	12	3.40	21	4.58	30	5.48	39	6.24	48	6.93	57	7.55	66
	4	2	13	3.61	22	4.69	31	5.57	40	6.32	49	7	58	7.62	67
	5	2.24	14	3.74	23	4.80	32	5.66	41	6.4	50	7.07	59	7.68	68
	6	2.45	15	3.87	24	4.90	33	5.74	42	6.48	51	7.14	60	7.75	69
	7	2.65	16	4	25	5	34	5.83	43	6.56	52	7.21	61	7.81	70
	8	2.83	17	4.12	26	5.10	35	5.92	44	6.63	53	7.28	62	7.87	71
9	3	18	4	24	27	5.2	36	6	45	6.71	54	7.35	63	7.94	72

\*Heat for the Warming and Ventilation of Buildings by J. H. Mills

# TEMPERATURE AND VOLUME OF STEAM

at Different Pressures

PRESSURE IN POUNDS		Temperature in Fahrenheit Degrees	VOLUME	
By Steam Gauge	Above Vacuum		Compared with Water	Cubic Feet of Steam from 1 lb. of Water
0	15	212.0	1642	26.36
5	20	228.0	1299	19.72
10	25	240.1	996	15.99
15	30	250.4	838	13.46
20	35	259.3	726	11.65
25	40	267.3	640	10.27
30	45	274.4	572	9.18
35	50	281.0	518	8.31
40	55	287.1	474	7.61
45	60	292.7	437	7.01
50	65	298.0	405	6.49
55	70	302.9	378	6.07
60	75	307.5	353	5.68
65	80	312.0	333	5.35
70	85	316.1	314	5.05
75	90	320.2	298	4.79
80	95	324.1	283	4.55
85	100	327.9	270	4.33
90	105	331.3	257	4.14
95	110	334.6	247	3.97
100	115	338.0	237	3.80
105	120	344.2	219	3.51
110	125	350.1	203	3.27
115	135	355.6	190	3.06
120	145	361.0	179	2.87
125	155	366.0	169	2.71

Table of Temperature, Specific Gravity and Weight of Water;  
also Pressure due to Different Heights in Feet

Temper- ature	Specific Gravity	Height in Feet	Pounds Pressure	Temper- ature	Specific Gravity	Height in Feet	Pounds Pressure
20	99980	1	43	132	9850	90	39.00
30	99962	2	86	142	9822	100	43.31
40	99900	5	2.16	152	9792	110	47.63
42	99897	10	4.33	162	9761	120	51.97
52	99950	15	6.49	172	9729	130	56.29
62	9986	20	8.66	182	9694	140	60.63
72	9974	25	10.82	192	9659	150	64.96
82	9959	40	17.32	202	9622	160	69.11
92	9941	50	21.65	212	9585	170	73.46
102	9921	60	25.80	220	9543	180	77.95
112	9890	70	30.11	230	9430	190	82.81
122	9875	80	34.65	245	9321	200	96.62

## HEAT UNITS IN WATER

Between 32° and 212° Fahrenheit, and Weight of Water  
per Cubic Foot

Temperature Degrees F.	Heat Units	Weight in Pounds per Cubic Foot	Temperature Degrees F.	Heat Units	Weight in Pounds per Cubic Foot	Temperature Degrees F.	Heat Units	Weight in Pounds per Cubic Foot
32	0.	62.42	123	91.16	61.68	168	136.44	60.81
35	3.	62.42	124	92.17	61.67	169	137.45	60.79
40	8.	62.42	125	93.17	61.65	170	138.45	60.77
45	13.	62.42	126	94.17	61.63	171	139.46	60.75
50	18.	62.41	127	95.18	61.61	172	140.47	60.73
52	20.	62.40	128	96.18	61.60	173	141.48	60.70
54	22.01	62.40	129	97.19	61.58	174	142.49	60.68
56	24.01	62.39	130	98.19	61.56	175	143.50	60.66
58	26.01	62.38	131	99.20	61.54	176	144.51	60.64
60	28.01	62.37	132	100.20	61.52	177	145.52	60.62
62	30.01	62.36	133	101.21	61.51	178	146.52	60.59
64	32.01	62.35	134	102.21	61.49	179	147.53	60.57
66	34.02	62.34	135	103.22	61.47	180	148.54	60.55
68	36.02	62.33	136	104.22	61.45	181	149.55	60.53
70	38.02	62.31	137	105.23	61.43	182	150.56	60.50
72	40.02	62.30	138	106.23	61.41	183	151.57	60.48
74	42.03	62.28	139	107.24	61.39	184	152.58	60.46
76	44.03	62.27	140	108.25	61.37	185	153.59	60.44
78	46.03	62.25	141	109.25	61.36	186	154.60	60.41
80	48.04	62.23	142	110.26	61.34	187	155.61	60.39
82	50.04	62.21	143	111.26	61.32	188	156.62	60.37
84	52.04	62.19	144	112.27	61.30	189	157.63	60.34
86	54.05	62.17	145	113.28	61.28	190	158.64	60.32
88	56.05	62.15	146	114.28	61.26	191	159.65	60.29
90	58.06	62.13	147	115.29	61.24	192	160.67	60.27
92	60.06	62.11	148	116.29	61.22	193	161.68	60.25
94	62.06	62.09	149	117.30	61.20	194	162.69	60.22
96	64.07	62.07	150	118.31	61.18	195	163.70	60.20
98	66.07	62.05	151	119.31	61.16	196	164.71	60.17
100	68.08	62.02	152	120.32	61.14	197	165.72	60.15
102	70.09	62.00	153	121.33	61.12	198	166.73	60.12
104	72.09	61.97	154	122.33	61.10	199	167.74	60.10
106	74.10	61.95	155	123.34	61.08	200	168.75	60.07
108	76.10	61.92	156	124.35	61.06	201	169.77	60.05
110	78.11	61.89	157	125.35	61.04	202	170.78	60.02
112	80.12	61.86	158	126.36	61.02	203	171.79	60.00
114	82.13	61.83	159	127.37	61.00	204	172.80	59.97
115	83.13	61.82	160	128.37	60.98	205	173.81	59.95
116	84.13	61.80	161	129.38	60.96	206	174.83	59.92
117	85.14	61.78	162	130.39	60.94	207	175.84	59.89
118	86.14	61.77	163	131.40	60.92	208	176.85	59.87
119	87.15	61.75	164	132.41	60.90	209	177.86	59.84
120	88.15	61.74	165	133.41	60.87	210	178.87	59.82
121	89.15	61.72	166	134.42	60.85	211	179.89	59.79
122	90.16	61.70	167	135.43	60.83	212	180.90	59.76

## VOLUME AND WEIGHT OF AIR

and Weight of Vapor in Saturated Air

Temperature	Volume	Number of Cubic Feet to 1 Pound	Weight of 1000 Cubic Feet Dry Air	Tension of Vapor	Weight of Vapor Saturated in 1000 Cubic Feet	Weight of Air Displaced by Vapor
0	0.9340	11.460	87.260	0.04379	0.07930	0.1264
5	0.9449	11.591	86.289	0.05747	0.10289	0.1646
10	0.9551	11.726	85.251	0.07116	0.12588	0.2014
15	0.9653	11.869	84.317	0.08535	0.14932	0.2389
20	0.9755	11.992	83.403	0.10748	0.18180	0.2909
25	0.9857	12.125	82.440	0.13367	0.22871	0.3661
30	0.9959	12.258	81.566	0.16581	0.27491	0.4398
32	1.0000	12.311	81.235	0.17989	0.29633	0.4741
36	1.0082	12.417	80.515	0.21066	0.35201	0.5632
40	1.0163	12.523	79.872	0.24604	0.40770	0.6523
44	1.0244	12.629	79.176	0.28647	0.47070	0.7531
48	1.0326	12.735	78.493	0.33284	0.54204	0.8672
52	1.0408	12.841	77.825	0.38574	0.62282	0.9965
56	1.0489	12.947	77.220	0.44352	0.71063	1.1370
60	1.0571	13.053	76.628	0.51683	0.82173	1.3147
64	1.0652	13.159	75.988	0.59229	0.93390	1.4943
68	1.0734	13.265	75.357	0.67994	1.0631	1.7008
72	1.0816	13.371	74.794	0.78018	1.21050	1.9368
76	1.0897	13.477	74.184	0.89103	1.31715	2.1076
80	1.0979	13.583	73.638	1.01669	1.5540	2.4864
84	1.1060	13.689	73.046	1.15705	1.7536	2.8058
88	1.1142	13.795	72.464	1.31554	1.9772	3.1635
92	1.1223	13.901	71.942	1.49067	2.2257	3.5611
96	1.1305	14.007	71.377	1.69214	2.5060	4.0096
100	1.1387	14.113	70.872	1.91937	2.8220	4.5152
104	1.1468	14.219	70.323	2.14669	3.133	5.0138
108	1.1550	14.325	69.784	2.43323	3.523	5.6368
112	1.1631	14.431	69.300	2.72984	3.926	6.2826
116	1.1713	14.537	68.776	3.05954	4.367	6.9882
120	1.1794	14.643	68.306	3.41728	4.843	7.7488
124	1.1876	14.749	67.797	3.81775	5.371	8.5940
128	1.1957	14.855	67.295	4.26073	6.088	9.7430
132	1.2039	14.961	66.845	4.72888	6.559	10.4950
136	1.2121	15.067	66.357	5.25807	7.240	11.584
140	1.2202	15.173	65.919	5.81736	7.957	12.731
144	1.2284	15.279	65.442	6.48029	8.800	14.048
148	1.2365	15.385	64.977	7.14323	9.630	15.408
152	1.2447	15.491	64.568	7.9104	10.595	16.952
156	1.2528	15.597	64.102	8.6923	11.566	18.506
160	1.2610	15.703	63.694	9.5948	12.681	20.290
164	1.2691	15.809	63.251	10.5579	13.828	22.125
168	1.2773	15.915	62.814	11.4673	14.950	23.920
172	1.2855	16.021	62.422	12.7165	16.47	26.36
176	1.2936	16.127	61.996	13.8657	17.43	27.89
180	1.3018	16.233	61.614	15.2343	19.47	31.96
184	1.3099	16.339	61.200	16.6030	21.08	33.73
188	1.3181	16.445	60.790	18.1447	22.89	36.63
192	1.3262	16.551	60.423	19.7441	24.75	39.60
196	1.3344	16.657	60.024	21.4297	26.69	42.71
200	1.3426	16.763	59.666	23.2962	28.85	46.16



# GALVANIZED SHEET IRON SIZES AND WEIGHTS

Gauge	Size	Ounces per Sq. Foot	Weight of Sheet in Lbs.	Gauge	Size	Ounces per Sq. Foot	Weight of Sheet in Lbs.
14	24x84	52½	46	23	36x84	20½	27
"	26x84	"	49½	"	40x84	"	20
"	28x84	"	53½	"	24x96	"	20½
"	30x84	"	57½	"	26x96	"	22½
16	24x84	42½	37	"	28x96	"	24
"	26x84	"	40½	"	30x96	"	25½
"	28x84	"	43½	"	32x96	"	27½
"	30x84	"	46½	"	36x96	"	31
"	24x96	"	42½	"	40x96	"	34½
"	26x96	"	46	"	44x96	"	37½
"	28x96	"	49½	24	24x84	18½	16½
"	30x96	"	53	"	26x84	"	17
18	24x84	34½	30½	"	28x84	"	19
"	26x84	"	32	"	30x84	"	20½
"	28x84	"	35½	"	32x84	"	22
"	30x84	"	37½	"	36x84	"	24
"	36x84	"	43½	"	40x84	"	27
"	24x96	"	34½	"	24x96	"	18½
"	26x96	"	36	"	26x96	"	20
"	28x96	"	40½	"	28x96	"	21½
"	30x96	"	42½	"	30x96	"	23
"	36x96	"	51	"	32x96	"	24½
19	28x84	30½	31	"	36x96	"	27
20	24x84	26½	23	"	40x96	"	31
"	26x84	"	25	"	44x96	"	34
"	28x84	"	27	26	24x84	14½	12½
"	30x84	"	29	"	26x84	"	13
"	36x84	"	34½	"	28x84	"	14½
"	24x96	"	26	"	30x84	"	16
"	26x96	"	28	"	32x84	"	17
"	28x96	"	31	"	36x84	"	19
"	30x96	"	33	"	24x96	"	14½
"	36x96	"	42	"	26x96	"	15½
22	24x84	22½	19½	"	28x96	"	17
"	26x84	"	21½	"	30x96	"	18½
"	28x84	"	23	"	32x96	"	19
"	30x84	"	24½	"	36x96	"	21
"	36x84	"	29½	28	24x84	12½	11
"	40x84	"	33	"	26x84	"	11½
"	24x96	"	22	"	28x84	"	12
"	26x96	"	24½	"	30x84	"	13
"	28x96	"	26½	"	32x84	"	14½
"	30x96	"	28	"	36x84	"	16
"	36x96	"	33½	"	24x96	"	12
"	40x96	"	37	"	26x96	"	13½
23	24x84	20½	18	"	28x96	"	14½
"	26x84	"	19½	"	30x96	"	15½
"	28x84	"	21	"	32x96	"	16½
"	30x84	"	22½	"	36x96	"	18½
"	32x84	"	24				



# MASSACHUSETTS DISTRICT POLICE

## Boiler Inspection Department.

Office, State House.

### Requirements of Boiler Inspection Department of District Police as to F for Low Pressure Heating Boilers.

Upon all steam boilers used for heating purposes, having a grate area of over two square feet and subject to inspection by this department, the following fittings must be provided, being necessary for safety.

One safety valve on each boiler, with no obstruction between valve and boiler. If pressure carried is to be below 25 pounds, the least area of the safety valve in inches is to be reckoned by dividing the area of grate in square feet by  $2\frac{1}{2}$  if a pop valve is used, or by 3 if a lever, weight, or simple spring valve is used.

One steam gauge on each boiler, connected with syphon or equivalent device between gauge and boiler, to fill gauge spring with water. The supply pipe is to come from steam space of boiler.

Each boiler must have at least two try cocks, the lower one to be placed  $2\frac{1}{2}$  inches above the fusible plug or lowest safe water line. Where a glass is also used, the lower end of glass must be above the fusible plug or lowest safe water line.

Each boiler must be provided with stop valve on main steam pipe leading from boiler. Each boiler must have check valve and stop valve on main return pipe.

Where a damper regulator is used, the pressure supply pipe must be taken from the steam space of the boiler.

### Safety Valves for High Pressure.

If pressure carried is between 25 and 100 pounds, the area of safety valve in inches must equal the area of grate in square feet divided by 3, for lever or dead weight valves, and by 4 for pop valves. If pressure is above 100 pounds, divide by 5 for pop valves and 4 for lever or dead weight valves.

*Joseph E. Shaw*  
Chief Mass. District Police

Form No. 15A.



## Commonwealth of Massachusetts.

## DISTRICT POLICE.

## INSPECTION DEPARTMENT.

*Mass.**190*

5m

In the ventilation of school buildings the many hundred examinations made by the inspectors of this department have shown that the following requirements can be easily complied with —

1. That the apparatus will, with proper management, heat all the rooms, including the corridors, to  $70^{\circ} F$  in any weather.

2. That, with the rooms at  $70^{\circ}$  and a difference of not less than  $40^{\circ}$  between the temperature of the outside air and that of the air entering the room at the warm-air inlet, the apparatus will supply at least thirty cubic feet of air per minute for each scholar accommodated in the room.

3. That such supply of air will so circulate in the rooms that no uncomfortable draught will be felt, and that the difference in temperature between any two points on the breathing plane in the occupied portion of a room will not exceed  $2^{\circ}$ .

4. That vitiated air in amount equal to the supply from the below will be removed through the ventilators.

5. That the sanitary appliances will be so ventilated that no odors therefrom will be perceived in any portion of the building.

To secure the approval of this department of plans showing methods or systems of heating and ventilation, the above requirements must be guaranteed in the specifications accompanying the plans.

## INDEX

## DIRECT RADIATORS

	PAGE
Bay Window, . . . . .	14
Brackets	
Baseboard, . . . . .	18
Concealed, . . . . .	16 and 17
Wall, . . . . .	18
X-Ray, . . . . .	21
Circular, . . . . .	15
Corner, . . . . .	13
Coronet, . . . . .	6
Curved, . . . . .	14
Detached Base, . . . . .	9—11
Diadem, . . . . .	7
Fittings, . . . . .	22
Imperial Union, . . . . .	2
Princess Union, . . . . .	3
Princess Five Column (Window), . . . . .	12
Royal Union, . . . . .	4
Scepter, . . . . .	5
Solid High Legs, . . . . .	17
Sovereign Union, . . . . .	8
Tappings (Regular), . . . . .	23
Wall Box, . . . . .	11
X-Ray, . . . . .	19 and 20

## AIR VALVES

Nos. 1 and 2, . . . . .	26
Nos. 3, 4, 5 and 6, . . . . .	27
Nos. 7, 8 and 9, . . . . .	28
Construction and Operation, . . . . .	26
Elbows (Nos. 6 and 7), . . . . .	28

## INDEX

## INDIRECT RADIATORS

	PAGE
Fittings.	37
Gold Pin	
Flange (10-Inch).	31
12-Foot Nipple.	32
15 and 20-Foot Nipple.	33
Regular Pattern.	30
School House Work.	14 and 35
School Pin (15 Feet and 20 Feet).	36

## RULES AND PRACTICAL DATA

Circles—Area and Circumference.	44 and 45
Decimal Equivalents.	46
Discharge of Air from Flues.	51
Expansion of Wrought Iron Pipe.	43
Galvanized Iron—Sheet and Pipe.	35
Heat Units in Water.	33
Iron Pipe Sizes of Brass Pipe.	40
Metric System.	41
Movement of Warm Air in Flues.	50
Net Faces on Radiators.	40 and 41
Registers.	43
Relative Proportions of a Warming Apparatus.	46
Safety Valves.	56 and 57
Temperature and Volume of Steam.	52
Temperature, Weight, etc., of Water.	53
Volume and Weight of Air.	54
Weights and Measures.	45
Wrought Iron Welded Pipe.	45





